plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

DR. W. ANDREW WESLEY
PRESIDENT
AMERICAN ELECTROPLATERS' SOCIETY
1960-1961

PLATING MAGAZINE

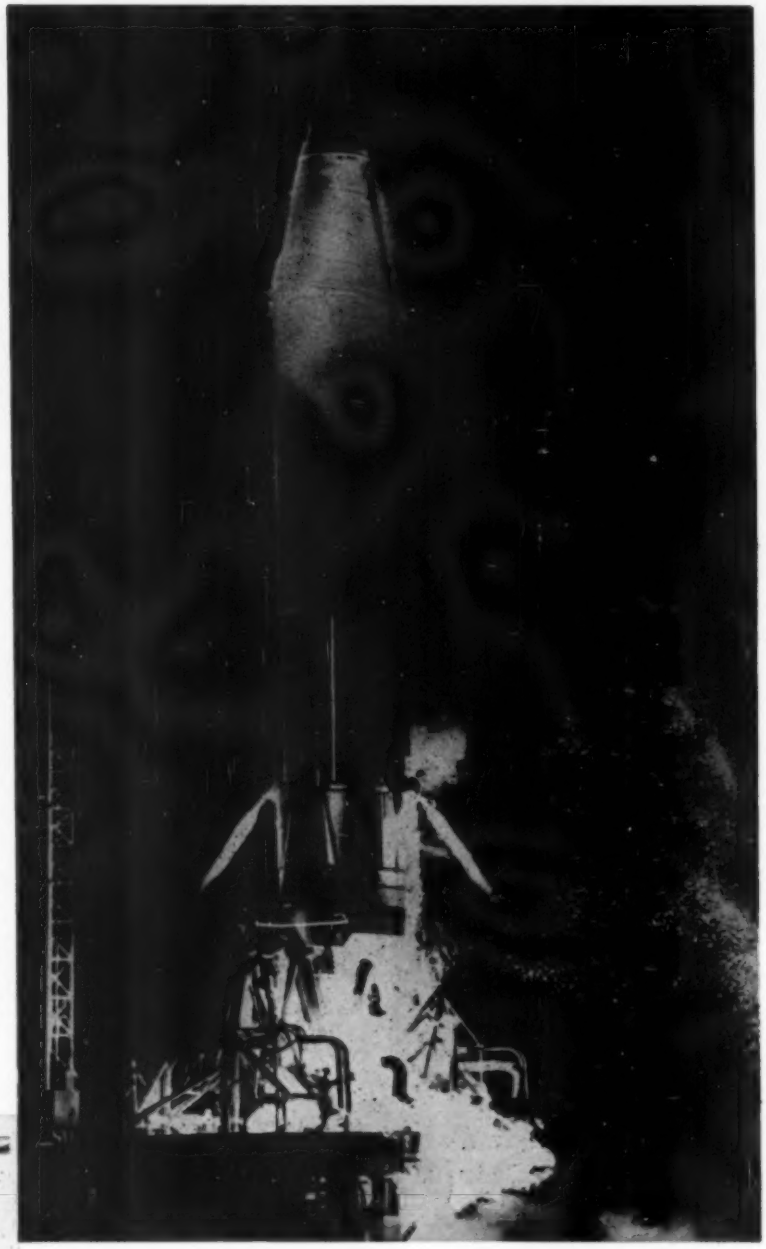
AUDITED PAID CIRCULATION ABC

University Microfilms
313 N. First St.
Ann Arbor, Michigan

SEPTEMBER - 1960

"WE PLATE MISSILE CONTACTS WITH SEL-REX BRIGHT GOLD* -AN EXTRA MEASURE OF RELIABILITY"

—Elco Corporation, Philadelphia, Pa.



The failure of a single component can put even the mighty Atlas Missile out of commission. That's why an electroplate of SEL-REX BRIGHT GOLD is specified to give an extra measure of reliability to Elco's patented VARICON Contacts used in missiles, rockets, computers and similar critical applications.

The VARICON Contact, with its fork-like design and 4 coined mating surfaces, offers exceptional resistance to numerous punishing insertions and withdrawals—meeting or surpassing the most exacting specifications. Patented SEL-REX BRIGHT GOLD, which produces a fine grained, dense electroplate—twice as hard as conventional 24K Gold plate — is a major reason for the reputation of quality and reliability enjoyed by VARICON throughout all industry.

SEL-REX makes the world's largest selection of processes and systems which take the guesswork out of plating with precious metals. Baths are simply maintained with scientific precision by additions of pre-measured salts or solutions. Your assurance of consistent quality results from one batch to the next.

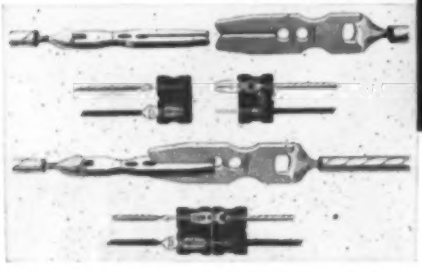


Photo shows Elco's patented Varicon Connectors and unique fork-like contact plated with Sel-Rex Bright Gold.

An internationally based network of sales and service technicians is at your beck and call to make sure you get the optimum results built into every SEL-REX PROCESS.

Complete technical literature free on request. Specify precious metal(s) and your application.

*Patented

Patented processes for plating with Gold, Rhodium, Platinum, Paladium, Silver, and to produce "custom alloys" for your particular requirements.

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SEL-REX CORPORATION

NUTLEY 10, NEW JERSEY

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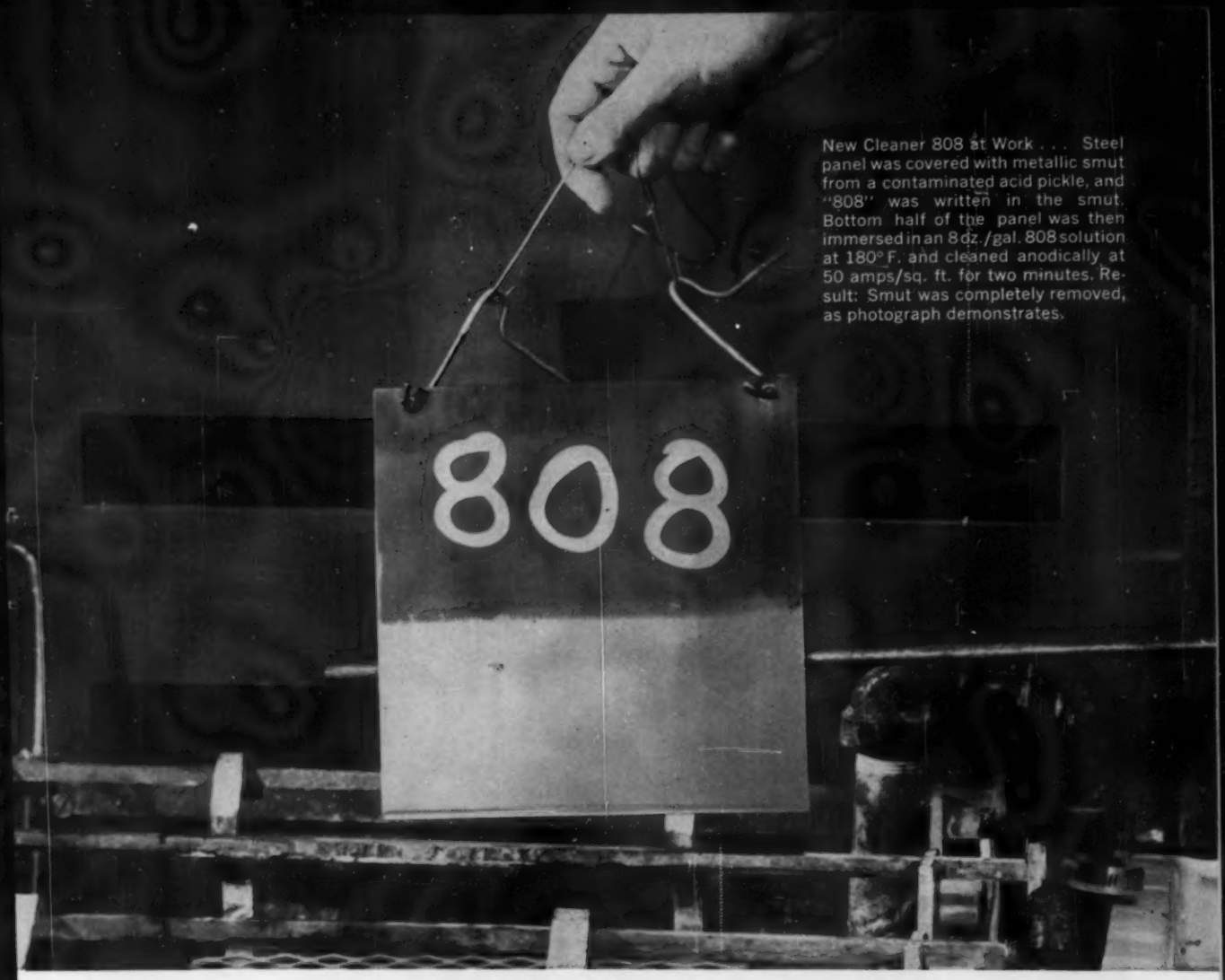

New Cleaner 808 at Work . . . Steel panel was covered with metallic smut from a contaminated acid pickle, and "808" was written in the smut. Bottom half of the panel was then immersed in an 8 oz./gal. 808 solution at 180° F. and cleaned anodically at 50 amps/sq. ft. for two minutes. Result: Smut was completely removed, as photograph demonstrates.

For Steel . . . **NEW CHELATING ELECTRO-CLEANER**
Removes Light Rust, Scale, Smut, Oxides

Cleaner 808, a new development of Enthonics research, is an alkaline electro-cleaner with chelating action. Its selective chelating agents chemically encircle and remove smut, oxides, light scale and rust. Its high-detergency, high-conductivity ingredients complete the cleaning job. Result: Bright surfaces completely free of contamination.

Cleaner 808 is excellent for anodic cleaning of steel which has just enough rust or scale to defy conventional electro-cleaners. In most applications, by using the work as an anode at current densities of 50-75 amps/sq. ft., cleaning time is 1 to 5 minutes.

Cleaner 808 also is being used cathodically. One such application: Cleaning used automobile bumpers for replating.

Cleaner 808 is a dustless, free-flowing alkaline powder with superior wetting, penetrating and dispersing characteristics, and water softening action. A low foam blanket minimizes spray and hydrogen gas explosion. Because oils are displaced and float to the surface, the cleaning solution is free of contamination, has long life.

For complete information about Cleaner 808 with chelating action, write to Enthone, Inc., 442 Elm Street, New Haven 8, Conn.

ASARCO

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A Subsidiary of American Smelting and Refining Company

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- Maximum heat transfer

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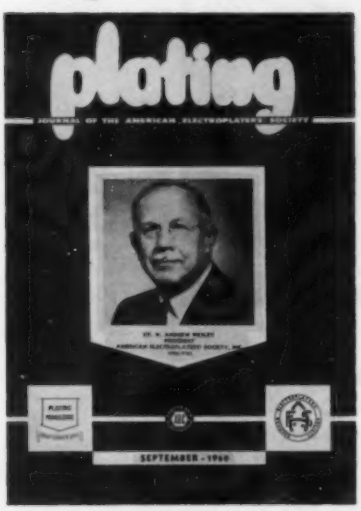

Cover by James A. Civille

plating
JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

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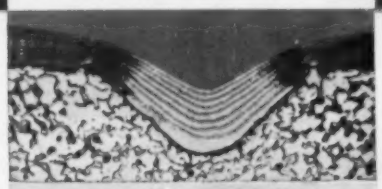
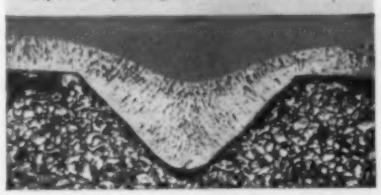
Gives you insurance against air supply failure because it operates efficiently with any agitation system.

Airglow allows the use of current densities much higher than attainable from mechanically agitated systems.

Levelling effects of Harshaw Airglow Bright Nickel deposit compared to that of Harshaw Perflow leveling semi-bright nickel.



TOP: Airglow Bright Nickel—1.5 mil deposit—depth of groove 3.1 mils.
BOTTOM: Perflow Semi-bright Nickel—1.5 mil deposit—depth of groove 3.2 mils.



- Airglow depth of color and brightness unequalled.
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EDITORIAL

MIRACLES

WE ARE LIVING in the Age of Miracles. We see color pictures transmitted through air; we travel at high speeds to faraway places; we probe the mysteries of space; we extend the life span of man. These wonders were made possible because bold steps in research and development were taken many years ago.

The frontiers of science in electroplating and finishing of metals and of allied arts have not been pushed forward perhaps as swiftly as, for example, science in the electronic industry. Additional stimulus is needed not only for the continued development of our industry but also for helping mankind to a better life.

The American Electroplaters' Society is, of course, in a unique position to promote science. It is contributing substantially to research and development through its PLATING MAGAZINE, its AES Research Program, its Conventions and Expositions, its Branch and Regional Meetings and other such elements of its diverse educational activities. Even more can be done, however, at Branch level. Branches must enlarge their present scope of research and educational responsibilities so as to penetrate deeper into the sciences. This can be achieved by encouraging qualified people at local level whose interests are in the future of science and technology to join and participate aggressively in Branch and National educational activities.

Some Branches have already acquired such members and, as a result, have profited from their membership. The members of these Branches now have a broader understanding of electroplating and finishing of metals and of allied arts which has prepared them to cope with the problems of tomorrow with efficiency and dispatch.

The object of the American Electroplaters' Society is stated in the preamble of its Constitution as follows:

> "The object of the Society shall be the improvement and dissemination of the knowledge of the arts and sciences of electroplating and of finishing of metals and of allied arts, the development of a cooperative spirit of friendship and mutual assistance among its members."

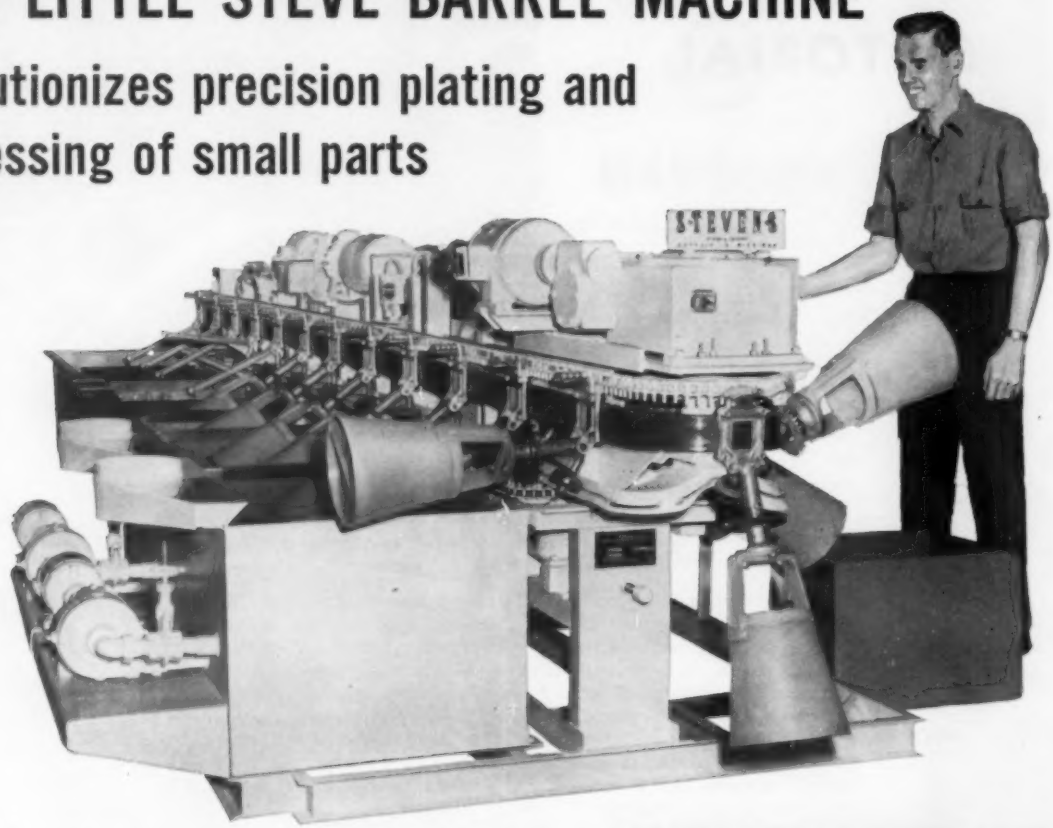
In the past, we have concentrated mainly on the arts of electroplating and finishing of metals and of allied arts. Now is the time to take the necessary action to fulfill the scientific aspect of our objective. This step will provide for the American Electroplaters' Society and the whole world, a continuing and ever-increasing reservoir of knowledge which will be the wellspring for the Miracles of Tomorrow.

Manuel Ben

Second Vice President
American Electroplaters' Society, Inc.

NEW LITTLE STEVE BARREL MACHINE

revolutionizes precision plating and processing of small parts



Completely automatic, extremely compact, mechanically flexible, inexpensive to buy, install, maintain.

Meet the newest member of the famous Little Steve family of automatic plating and processing machines. It is small . . . only 4 feet high by 6 feet wide . . . not much higher or wider than your desk. Designed for use in your integrated operations, it incorporates features that meet today's rigid manufacturers' specifications. For example, this new Little Steve provides: • **precision plating on an automatic basis** • **low ceiling height and light floor load** • **designed for integrated process manufacturing** • **oblique barrels that require no lids** • **automatic loading and unloading** • **minimum solution and anode requirements.**

PLUS many more of the exclusive features that are part of every dependable, long-lasting, efficient Stevens plating and processing machine.

This exclusive selective "skip track" feature permits elimination or addition of any processing step. Note "no lid" barrels, easy accessibility of mechanism to operator standing on the floor.

Write today for complete information on this processing profit-builder.

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TO YOU its regular advertisers, PLATING MAGAZINE is happy to report that YOUR confidence in it, manifested by the quantity of YOUR advertising insertions in its monthly advertising pages during its fiscal year ended June 30, 1960, enabled PLATING to increase not only the quantity of its advertising pages during that fiscal year compared with the corresponding 1958-1959 period, but also the amount of its advertising dollar volume during the same period.

In expressing its appreciation to YOU, its regular advertisers, for this proved confidence in it as a medium for bringing YOUR sales promotion story to the electroplating, metal finishing and allied arts market, PLATING MAGAZINE also invites, most cordially, those of this field's advertisers who have not yet adequately sampled PLATING advertising, to weigh well, on merit, PLATING MAGAZINE's prestige, circulation, readership coverage, readership constancy, space rates and other values when preparing their 1960-1961 advertising budgets and schedules.

This is one of the principal reasons why PLATING MAGAZINE has published the little booklet whose two-tone cover is pictured above—so that, from its illustrated, simply written pages, such advertisers can determine for themselves as to whether it is of dollars and cents importance to them TOO to use PLATING MAGAZINE's advertising columns regularly and to maximum extent.

Copies of the booklet have already issued to many representative companies and their advertising agents with whom PLATING indeed desires to create and cement such a relationship. If through some mischance YOUR copy has not yet reached you, please write us. Without obligation or cost to you of any sort, a copy will promptly be sent for study and action by YOU the advertiser.

PLATING
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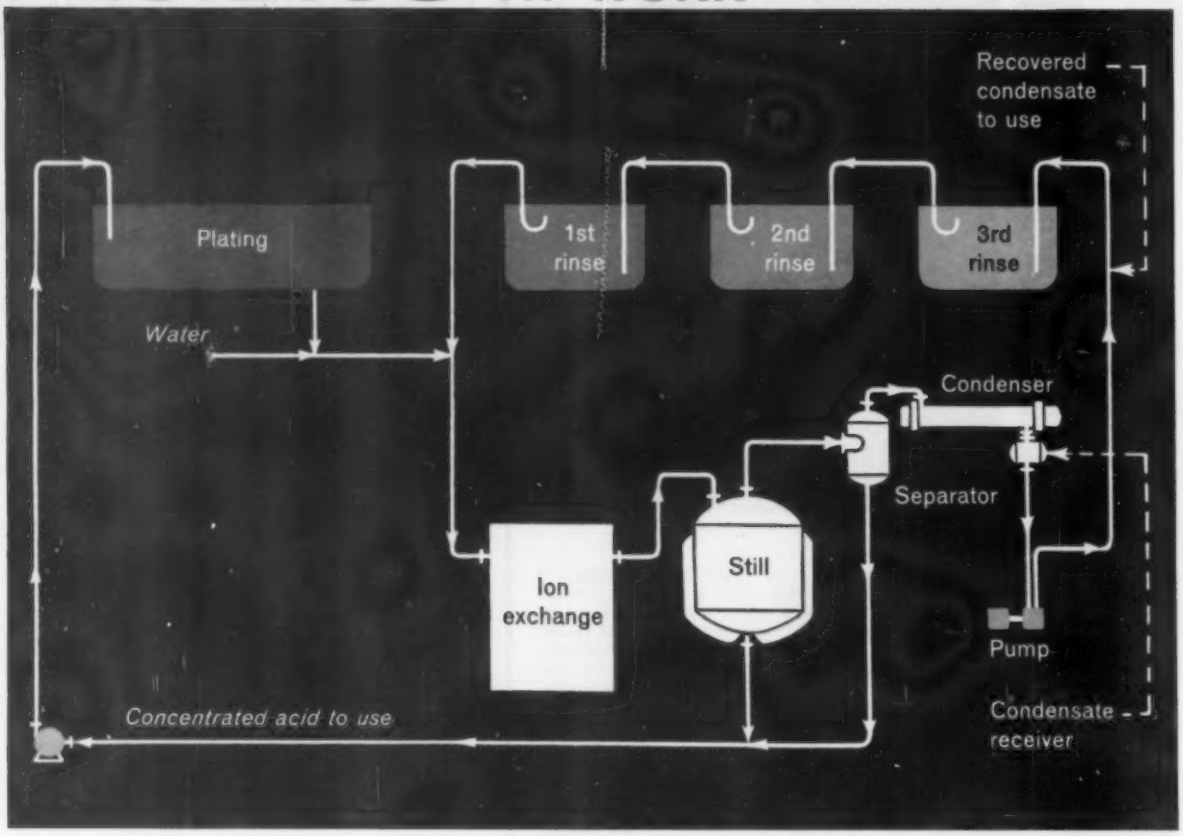
FLUIDICS* AT WORK



Flow chart shows a complete plating system including plating tanks, ion exchange, acid still, separator and condenser, and counter current rinse tanks.

Turn plating wastes to profit

If you handle chromic acid, cyanide, nickel sulfate, or aluminum bright-dip solutions, you can render wastes harmless and recover valuable materials with a *single* system.

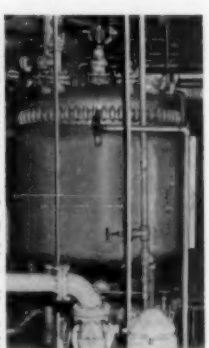
Fast pay-out. For example, one large Midwestern plant "plating out" approximately one-fifth of the chromic acid used, sewered his waste. Then an acid-recovery system was installed. Result: Almost all acid formerly lost to the sewer is recovered for re-use. And, stream pollution has ceased to be a problem.

With chromic acid costing 30 cents a pound, this quickly translates to substantial annual savings for the average plater.

Packaged systems. Such economies can be realized in your plant when you turn to Pfaudler for an *integrated* approach to plating-waste recovery systems. Pfaudler Project Engineering service can give you assistance in design, specification, layout and installation.

One source. With Pfaudler you get *single responsibility* for a system geared to your wastes and production needs. This responsibility extends to all equipment, including ion exchange, since our Permutit Division has long been a major supplier of both equipment and resins.

Proper materials. Pfaudler matches materials of construction to each application. Acid stills like the one shown, for example, are made of Pfaudler® Glasteel, to resist a wide range of corrosives. Glasteel is used in receivers also to prevent metallic pickup by distilled water.



In other parts of the system stainless steel generally does the job efficiently and economically.

More information. For a more detailed look at Pfaudler waste-recovery systems and equipment, write for Reprint #522, or direct specific questions to our Pfaudler Division, Dept. P-90 Rochester 3, N. Y.

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS...the science of fluid processes

For outstanding brightness, ductility, adhesion, and leveling:

LEVELMAX

BRIGHT NICKEL PROCESS

The new Levelmax process now assures a bright smooth nickel coating for poorly polished steel, dull copper plate, unbuffed stampings and castings. Simple to control and maintain, Levelmax can be used under standard plating conditions. It has a high tolerance to organic and metallic contamination. The process provides excellent leveling action. The resulting bright nickel surface accepts chrome readily. Highly ductile, Levelmax permits crimping and forming operations. Extremely high current densities are permissible with conventional or air agitation. Nickel coverage is provided in recesses without burning in high current density areas. The process meets the requirements of varied product shapes, base metals and applications, reducing or eliminating surface buffing and polishing, and bright plating hard-to-buff areas. To date, Levelmax is being used in hundreds of thousands of gallons of nickel solution. Write or call for complete working details, to Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, REctor 2-9500, or call your nearest Federated Sales Office.

Zinc, brass, and steel parts are all plated in the same Levelmax bright nickel solution with outstanding results, in National Plating Corporation's semi-automatic operation in Cleveland.

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

FEDERATED METALS DIVISION

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udylite

research 'punch' breaks through the semi-bright nickel plating barrier!

the udylite corporation

BRAND NEW PROCESS is easier to operate and control, provides better uniformity of color and greater production efficiency than ever before!

here's why:

NO HARMFUL BREAKDOWN PRODUCTS. There are no harmful materials formed from the N2E addition agents as a result of the plating process! Thus, batch treatment is necessary only when contaminants from other sources enter the bath and continuous carbon filtration will not remove them. The result is a substantial saving in solution, downtime, manhours and additional chemicals ordinarily required to treat and rebuild the plating bath.

CONSISTENT UNIFORMITY. N2E addition agents are noncritical in concentration. Reasonable variations from recommended concentrations will not seriously affect the characteristics of the deposit. Overall uniformity of color is maintained. Even in deep recesses on the backs of intricate die castings, amazingly clean deposits are obtained.

WIDE CURRENT DENSITY RANGE. N2E's average current density range is 30 to 60 amperes per square foot, with a considerably higher limiting current density. This wide range permits faster plating at a higher average current density without burning.

GREATER TOLERANCE TO METALLIC IMPURITIES. The absence of harmful breakdown products is of special importance in connection with metallic contaminants, since the undesirable effects of the two are cumulative. Another N2E 'plus' factor that helps maintain uniformity and quality.

ADHESION GREATLY IMPROVED. Production experience over a considerable period of time has conclusively demonstrated the excellent adhesion characteristics of Udylite N2E in combination with the Incomparable '66' Bright Nickel Process.

ECONOMICAL CONTINUOUS FILTRATION. One of the outstanding advantages of N2E is the fact that the bath can be continuously filtered through an activated carbon pack without appreciable loss of brighteners. The cleaning action of the continuous carbon filtration permits long periods of uniform, high quality production. The stability of N2E addition agents also permits economical bath purification by low current density electrolysis.

CAN BE ADDED DIRECTLY TO BATH. N2E addition agents are liquid and can be added directly to the bath without the use of filters. For high-speed operation, air agitation of the bath is recommended, although N2E performs well with mechanical agitation and can even be used without agitation.

See for yourself what N2E can do to improve your plating operation. Submit one of your problem parts for test plating now. See your Udylite representative. Or, write or phone:

detroit 11, michigan • on the west coast: **L. H. Butcher Co.**

world's largest plating supplier

udylite

Oakite offers a

metal-matched

For the complete answer to better plating

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 FIELD SERVICE MEN • OVER 160 MATERIALS

complete line of materials for

ELECTROCLEANING

. . . improves the cleaning
. . . improves the plated-work

There are Oakite electrocleaners to meet the special requirements of all the usual basis metals being plated, and the soils generally left on the parts during fabrication operations.

Matched to the work, each electrocleaner does the job with remarkable efficiency and surprising economy. Service results show it. Users find that solutions have long life. Operating problems are at a minimum. Most importantly, a metal-matched electrocleaner assures a brighter and perfectly adhering plated finish.

TWO-IN-ONE CLEANING OF STEEL

Oakite 190 does double duty. A *chelated* detergent for anodic or periodic reverse current use, it removes smut, heat scale and rust bloom that normally need extra treatment. At the same time, its powerful alkaline detergency gets rid of oil films and shop soil. Such cleaning insures fewer plating rejects, and can in many cases eliminate an entire operating step.

CLEANING OF COPPER WITHOUT TARNISH

Oakite 191 gives fast, thorough electrocleaning action on brass and other copper alloys, while protecting against tarnish . . . especially in reverse current cleaning. Shop soils, smuts, light buffing compounds disappear quickly. For heavily soiled parts, the solution also serves as a non-tarnishing pre-soak.

FEWER REJECTS FOR ZINC DIE CASTINGS

Oakite 195 electrocleans without etching or discoloring buffed zinc base die castings . . . also works well with lead, brittania metal, steel and brass. Used with direct, reverse or periodic reverse current, it removes soils safely yet thoroughly . . . assuring a brighter chromium luster. Many users of this new cleaner have reported no rejects due to poor electrocleaning for the first time in their experience.

Ask Oakite to detail what's in store for you when you match these materials to your work. Write Oakite Products, Inc., 40 Rector Street, New York 6, N. Y.

it PAYS to ask . . . **OAKITE**

over 50 *Est. 1909 years' leadership in industrial cleaning*

Media-matched compounds offer better barrel finishing

A good match of compound to the job means clean and efficient media . . . faster cutting down, deburring . . . and proper lubrication for smooth burnishing. Oakite can match your needs with compounds for fine finishes, tight tolerances - for hard or soft water. Send for Bulletin F-9339.

Stop spotting, add sparkle with Oakite Rinsite®

After plating and barrel finishing, adding a little Rinsite to rinse water, helps cut water spotting and staining. It "thins" the rinse, makes it drain faster. It also leaves a thin, non-oily, invisible film that adds sparkle and indoor rust protection to plated parts. Send for Bulletin F-9822.

ANNOUNCING

ALDET

. . . a non-silicated aluminum cleaner that does not significantly etch!

This is a notable advance in modern aluminum processing.

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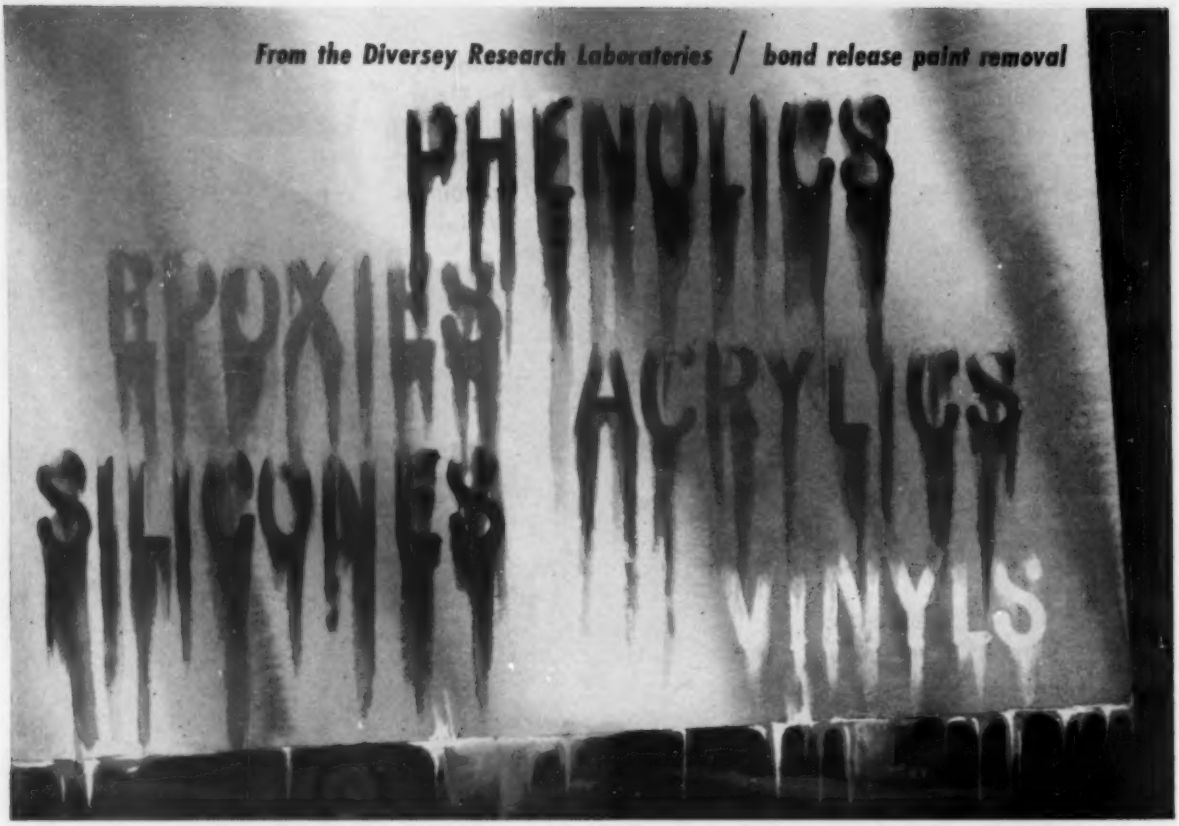

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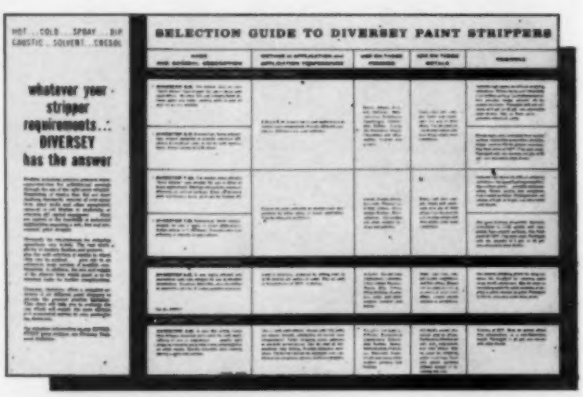

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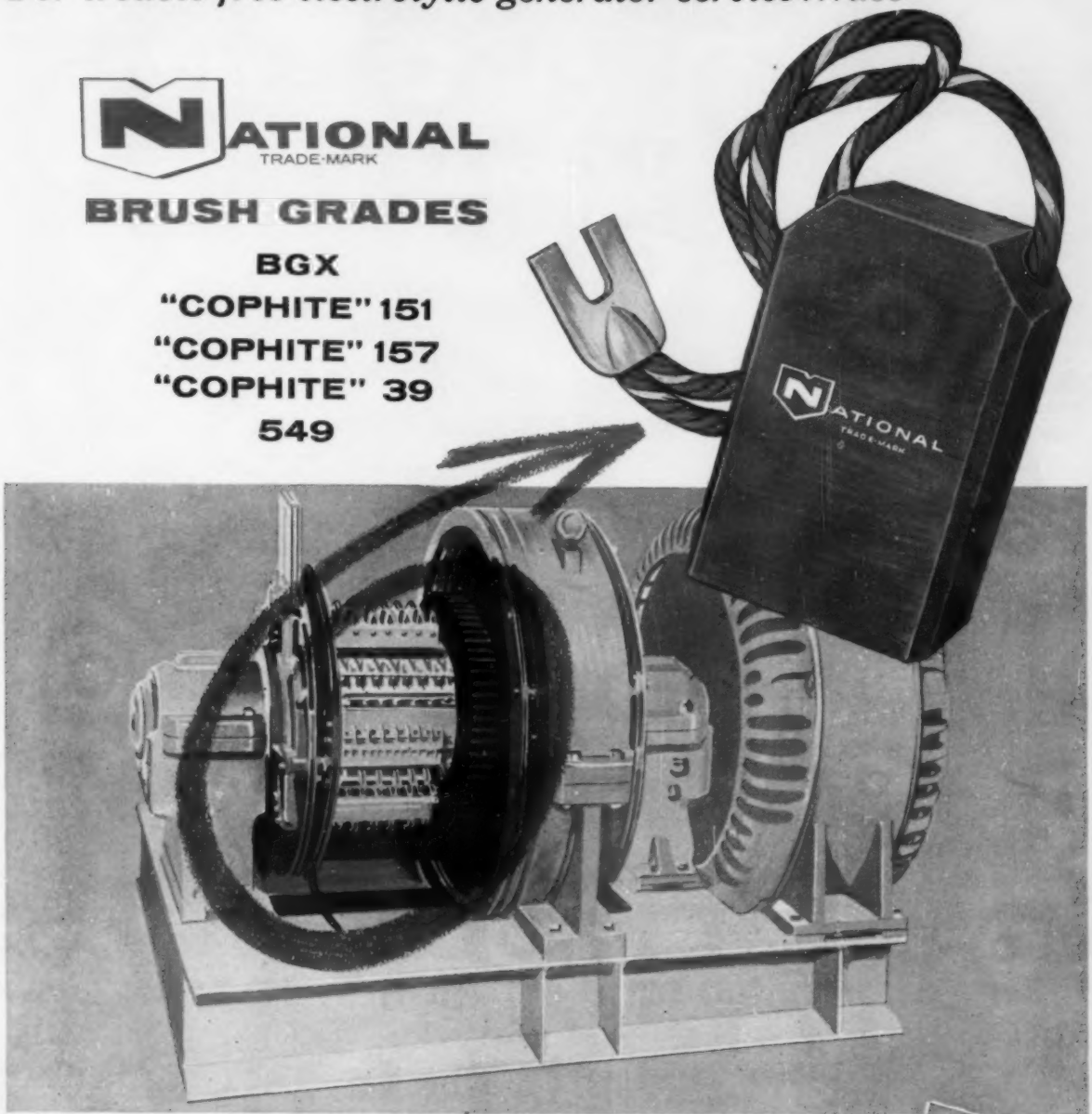

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GREETED by the President of the United States, the AES was welcomed to Michigan and Detroit by Governor G. Mennen Williams. The entire week of the AES's Convention, Exposition and International Conference was proclaimed by Detroit's Mayor as "AES GOLDEN JUBILEE WEEK IN DETROIT."

AS the Fifth International Conference on Electrodeposition and Metal Finishing, the Golden Jubilee Convention's educational sessions numbered eleven. Experts from nine countries, including the United States, England, Canada, Australia, France, Germany, Holland, India and Italy, presented 43 technical and scientific papers enriching knowledge in electroplating, metal finishing and allied arts. High spot of the sessions was the first "William Blum Lecture" that was delivered by the eminent Dr. William Blum, first winner of the AES Scientific Achievement Award, the Society's highest honor.

UNDER the supervision of the AES's Editorial Board, in collaboration with the International Council on Electrodeposition and Metal Finishing, the International Conference was planned for the AES by AES Past President Walter L. Pinner, Chairman of the International Council. His Committee included Dr. T. P. Hoar, Dr. Simon Wernick, A. W. Wallbank, R. A. F. Hammond and George Gardam of England and Myron B. Diggin, Dr. Walter R. Meyer and Dr. Richard B. Saltonstall of the United States.

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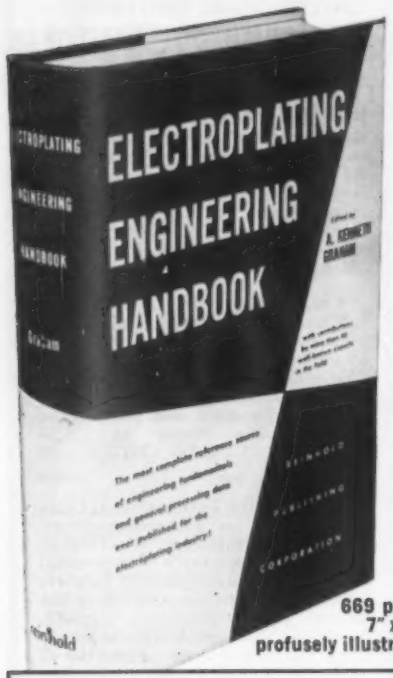
(1) Chairman Walter L. Pinner extending official welcome. Dr. William Blum, AES Scientific Award winner, seated. (2) Crowded auditorium at the first session. (3) Session Chairman T. P. Hoar introducing Dr. Blum, who delivered the first William Blum Lecture



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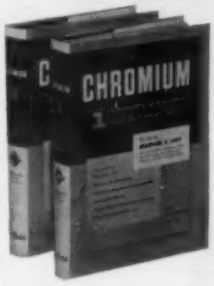

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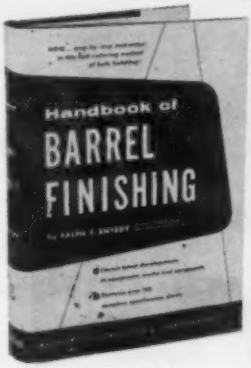

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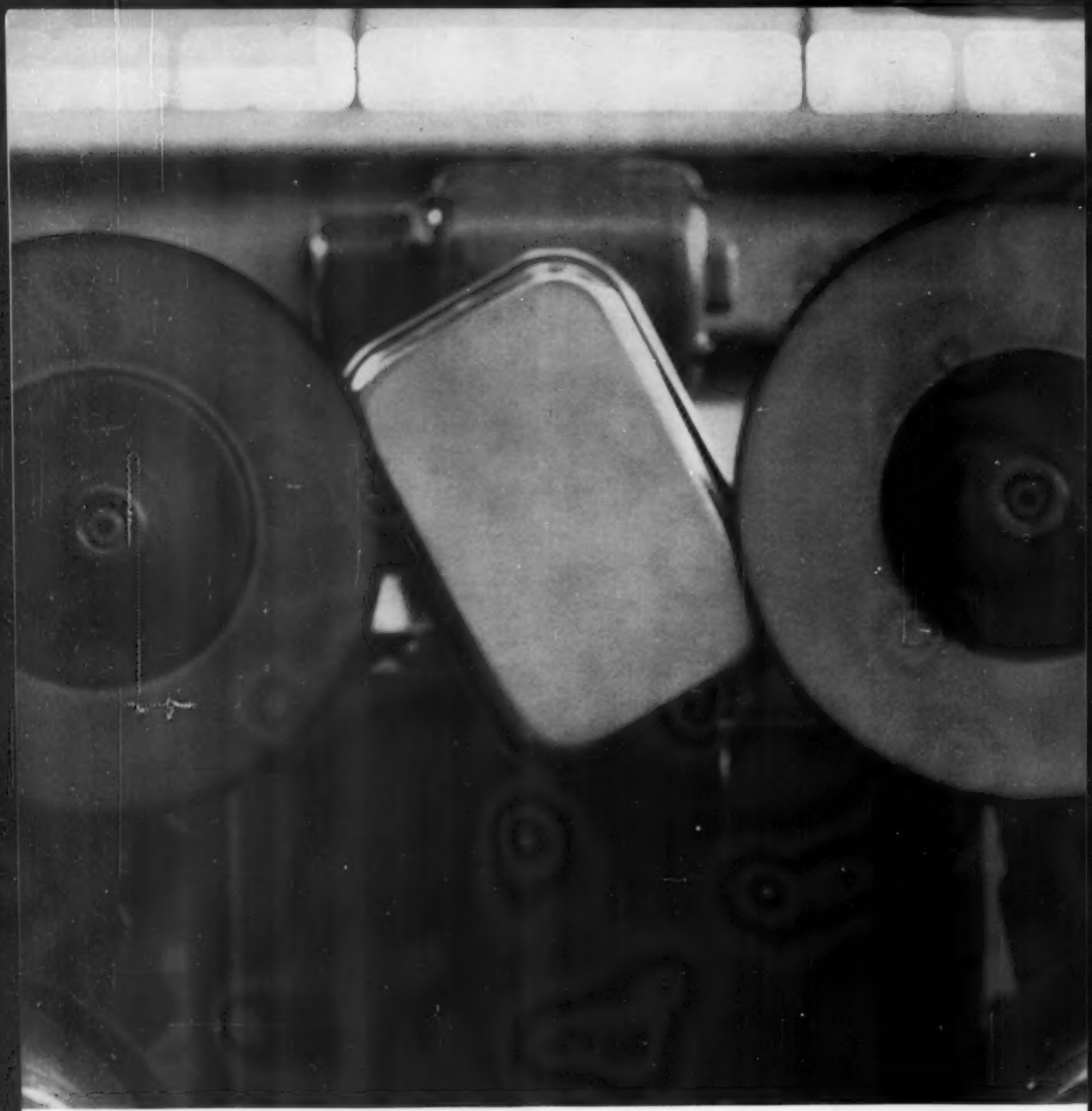

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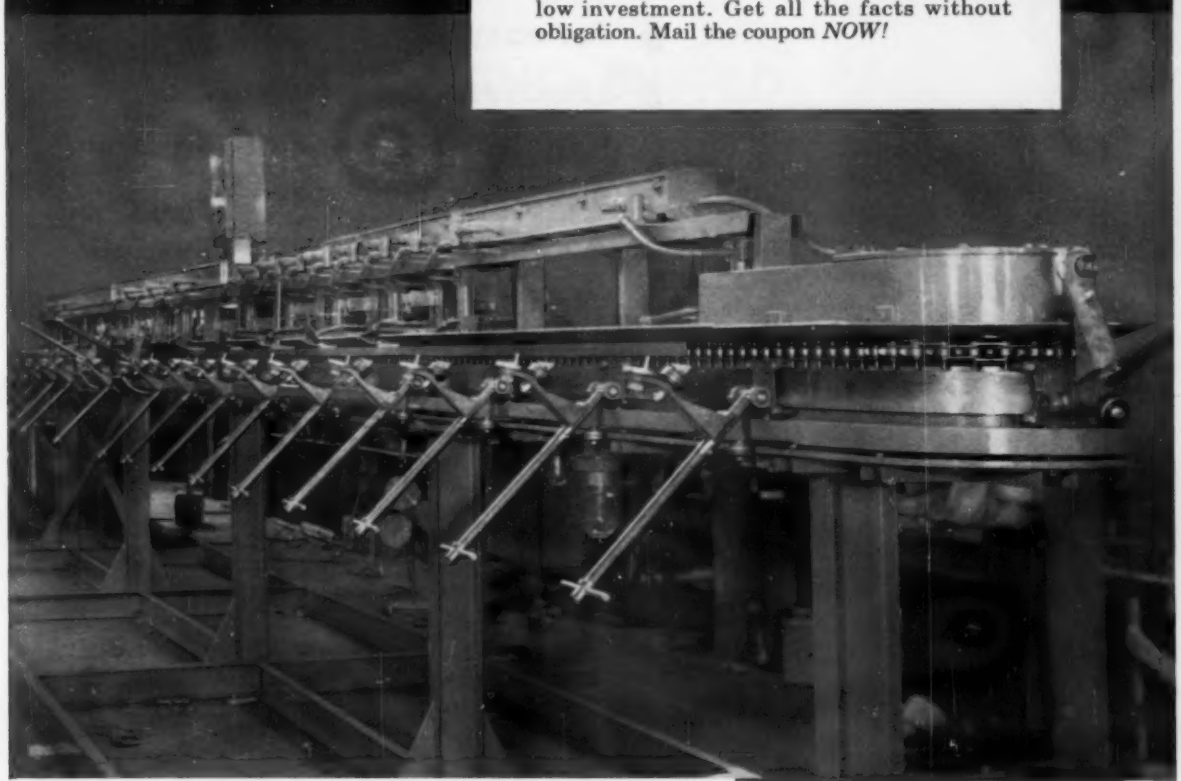

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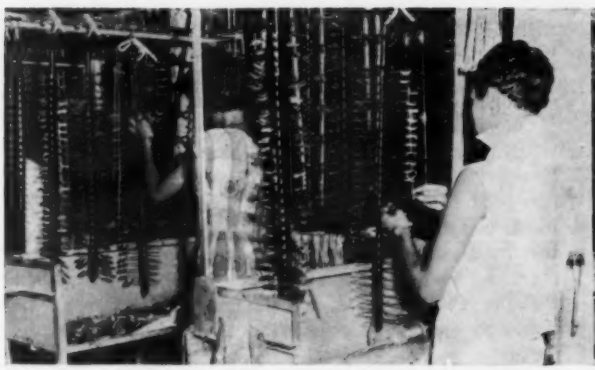

Fig. 1. Rackers at specially designed individual racking tables.

Fig. 2. Plating rack maintenance department.

PRACTICAL OBSERVATIONS ON PLATING BUFFED ZINC DIE CASTINGS

by NICHOLAS ANANIATIS*

DECORATIVE PLATING on zinc die castings is a phase of metal finishing that presents many problems. This article is based on varied detailed experience from which significant subjects are here presented.

Competitive Field

Manufacturers of zinc die castings are always on the alert for cheaper plating prices, faster service, better quality, for the obvious purpose of reducing manufacturing costs, thereby creating a competitive market in job shop production plating. Metal finishers who have invested in the proper equipment to handle production runs must constantly "feed" their assembly line or suffer the consequences of inactivity. This situation unfortunately compels platers to compete against one another, resulting in low-cost competition. However, this condition is directly responsible for the development of new methods and procedures for improving quality and bolstering production.

* Nassau Chromium Company, Mineola, New York.

Pricing Estimates Based on "Trouble-Free" Production

When referring to price quotation bids, the submitted price generally is in line with competition, based upon a "trouble-free" maximum production run. Pricing zinc die cast parts in production is basically dependent upon size, shape, and complexity of the casting, which will reflect the amount of pieces that may be processed on a rack, taking into consideration the proper positioning of the parts to obtain adequate overall plating coverage. Price estimates may be determined by the quantity of pieces on a rack, multiplied by the amount of racks plated per hour, and then divided into an hourly pre-established gross sales estimate, which reflects the customer's cost per piece. This commonly used method of calculation enables the plater to predetermine his production schedule and thereby realize his net margin of profit.

Regrettably, there are occasions when trouble occurs, such as blistered plate caused by faulty cleaning, excessive roughness and pitting in copper or nickel solutions, lagging production from improper plating coverage due to complexity

of part, etc. This unfortunate and oftimes anticipated setback naturally reduces the estimated production output and thereby increases operational costs commensurate with the seriousness of the involved problem.

PLATING RACKS

"Trouble-free" production plating is largely dependent on quality racks in good condition. Instituting the use of "preventive measures" will insure longer efficient rack life. Suggestions are listed as follows: (1) Proper storage facilities. (2) Careful handling to avoid mistreatment, especially by racking personnel. (3) Immediate repairing of damaged rack coatings. (4) Stripping operation, to prevent metal build-up on contact tips which is usually employed directly after unracking. See Figs. 1 and 2.

Fig. 3. Inspection department examines parts before and after plating for die casting defects.

ZINC DIE CASTING SURFACE DEFECTS

Inferior zinc die castings affect plating quality and cause frustrating problems for the plater. Polishing and buffing has in many cases hidden the defect only to have it "show up later" in the plating cycle. Briefly, the three most prominent surface defects are: (1) Cold shut—identified on the raw casting by circular twists on metal surface areas, and upon copper plating, the defect becomes magnified, resulting in rupturing of the polish finish. However, buffing after copper plating helps improve this condition. (2) Gas Pockets, in the form of a blister, is detectable on the raw metal. Surface tension developing in the plating operation aggravates this type of surface defect and consequently results in metal deposited on a thin layer of zinc which has lifted away from the casting. Parts indicating this defect *should not* be processed. (3) *Porosity* is the most troublesome defect to the plater, mainly because the pin-holes in the metal resemble that of pitted plating deposits. This condition often creates dissension with the manufacturer. Usually a letter or call explaining the situation will appease him. Fig. 3.

PLATING PROCEDURES

Methods of processing buffed zinc die castings differ, depending on the physical aspects of the part, nature of equipment and finishing technical "know how."

Improper cleaning causes blistered deposits resulting in rejects, and experience has proven that it is more economical to discard rejects as scrap metal, rather than to increase costs by stripping, rebuffing and replating.

Conventional methods of stripping composite coatings is virtually impossible without causing some damage to the base metal. The advent of newly improved proprietary strippers produce satisfactory results, however, additional equipment, cost of material, and method of stripping must be taken into consideration upon contemplating the use of this approved method. Therefore, it is readily understandable that the "cleaning cycle" plays an important part of production, and the following procedure is a commonly accepted method.

PLATING CYCLE FOR BUFFED ZINC DIE CASTINGS

Buffing compound remover soak		3 to 5 min.
Warm water rinse		
Electroclean	(anodic)	15 to 45 sec
Water rinse		
Acid dip	2 per cent Sulfuric acid	
Water rinse		
Copper strike		
Copper plate		
Water rinse		
Water rinse		
Acid dip	5 per cent Sulfuric acid	
Water rinse		
Water rinse		
Nickel plate		
Water rinse		
Water rinse		
Water rinse		
Chrome plate		
Water rinse	(reclaim rinse)	
Spray rinse		
Water rinse		
Neutralizing rinse		
Water rinse		
Hot water rinse	(to facilitate drying)	

Fig. 4. Parts being removed from the buffing compound remover are clean, clear and bright.

GENERAL CONCLUSIONS ON VARIOUS PRE-CLEANING OPERATIONS

Solvent Soak to loosen buffing compounds—effective in the removal of oils, and may be used with an additive to facilitate rinsing. When using this material, care must be exercised to completely remove the thin adherent oil film that remains on parts after rinsing, as oil contamination may result from carry-over of solvents. Soak cleaning prior to electrocleaning will offset this problem. Solvents used, such as kerosene or varsol, have little effect on most rack coatings, and the oily nature of this material has limited use as a buffing compound remover.

Soak Cleaners are compounded to do many cleaning jobs, and their primary function is the removal of oils, greases, drawing compounds, and also help prolong electrocleaner life. This type cleaner is not fully efficient for complete compound removal.

Vapor Spray-Degreasing—Highly effective remover of all types of oils and packed buffing compounds. Inhibited trichlorethylene is commonly used as the degreasing fluid, parts are hung in the vapor chamber until the buffing compound begins to soften and slowly dissolve; then the pressure spray is applied, dislodging the compound and effecting complete removal. This thorough cleaning method contains some restrictions on removing buffing compounds from polished die castings. (1) Cost of degreasing fluids are high compared to other methods of compound removal. (2) Most rack coatings are subject to damage by vapor degreasing. (3) Polished parts degreased in wire baskets require careful handling to avoid nicks and scratches—time consuming and cumbersome.

Buffing Compound Remover—Soak type cleaner especially formulated to remove buffing compounds on zinc base die casting without darkening or attacking the base metal. Cleaning time is from three to five minutes, and temperatures range from 150 to 170F. This efficient method of complete compound removal is generally preferred to other pre-cleaning processes, due to (1) ease of operation, (2) good rinsing with no contaminants, (3) cleaning costs per processed rack is relatively low and polished parts are cleaned on plating racks resulting in production cycle application. Fig. 4.

PLATING PROCEDURE

Electrocleaning—Proprietary electrocleaners for zinc die castings are usually formulated for anodic cleaning and designed to produce properly cleaned surfaces for plating by containing the following requirements: (1) Electrolytic cleaning action must remove surface films without excessive darkening or etching of the metal. (2) Good rinsing qualities. (3) Minimum foam control. (4) Suitable conditioning of zinc castings which eliminates cleaning surface shadows. (5) High tolerance to soil contamination, aiding electrocleaner life.

Average cleaning time is 30 to 60 seconds at about 6 volts, or 20 to 50 amp/sq ft with temperatures from 150 to 170F.

Acid Dip—Muriatic or sulfuric may be used, with preference for sulfuric, at concentrations of one half to 2 per cent by volume, time element averages two to five seconds or until gassing starts, indicating neutralization of alkaline cleaning film. Excessive gassing may result in: (1) "Pin-hole plate."

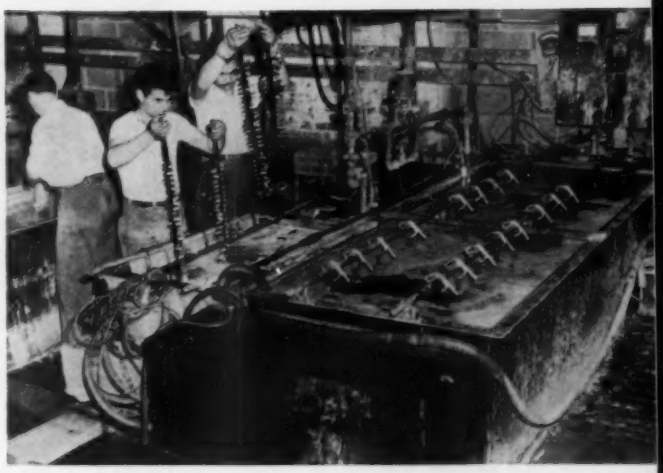

Fig. 5. Constant filtration on both copper strike and copper plating solution insures quality deposits at Industrial Plating Corp.

(2) Dulling of the polished surface. (3) Residual smut, causing blisters.

Copper Strike—Required on zinc die castings, prior to the plating solution to prevent immersion copper deposits, resulting in zinc contamination and consequent blistering. High speed copper baths generally use the potassium formulation, therefore a potassium copper strike should be used which eliminates intermediate rinsing. Constant filtration of the copper strike will yield clear stain-free strike deposits and reduce drag-in of organic contamination to the plating bath. Zinc contamination may be kept to a minimum by removing accumulated parts from the tank bottom after each working day. See Fig. 5.

Copper Plating Solution—High speed copper baths are designed to produce bright deposits at high current densities, thereby affecting a reduction in plating time. Operation, makeup and maintenance vary, depending on type and activity of solution. However, cyanide copper solutions require "effective filtration" for the removal of harmful contaminants, which are usually introduced into the bath due to improper cleaning, and also damaged rack coatings. Volume produc-

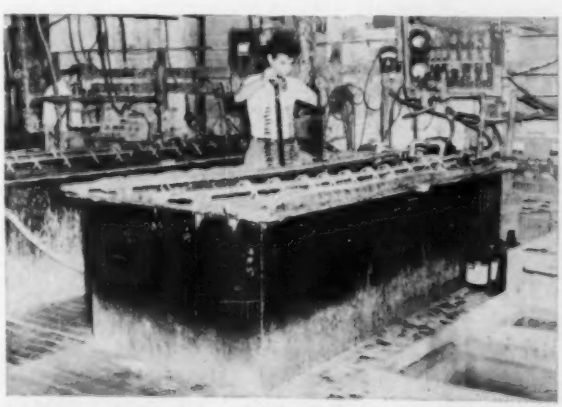

Fig. 6. 800-gal bright nickel bath using a 3000 gal/hr filtering unit for constant filtration, filter is housed in an area 30 feet from the production area.

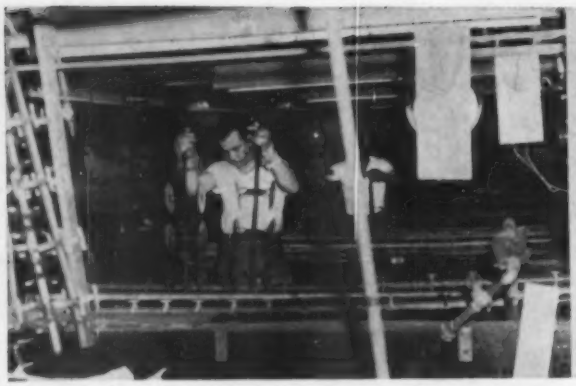

Fig. 7. Chromium plating tank in foreground concludes the production cycle, notice the plating tanks placed in line for smoother, more efficient operation. 3000 gal/hr nickel filter is at the lower right.

Fig. 8. Unracking area is eight feet from the chromium tank and parts are given a quick check for plating quality before unracking.

tion promotes roughness from impurities of "anode dissolution" and excessive chemical additions. A properly sized filter should be used, dependent upon the particular situation, which usually may be determined by consulting filter manufacturers and solution suppliers. Plating organizations attempting to economize on filtering costs should be reminded that "inadequate filtering reflects constant deficiencies."

Nickel Plating—Volume plating with competitive prices has resulted in the growing use of rapid air agitation in proprietarial nickel baths. Conversion to this type of solution is possible with provisions made for equipment especially designed to supply air agitation. Plating organizations contemplating the change will be interested in the following advantages: (1) Reduced plating time due to higher current density application. (2) Pitting and roughness are virtually eliminated due to turbulent action of plating solutions. (3) Increased throwing power. (4) Excellent leveling. (5) Reduced laminated plate difficulties. (6) Maximum brightness with corresponding ductility. See Fig. 6.

Proper solution maintenance helps to create "trouble free" plating. The source of many plating problems originate from the activities improperly conducted by inexperienced platers and tank operating personnel. Significant examples are cited: (1) Rinsing, prior to nickel plating. (2) Cathode rod cleaning. (3) Chemical additions. (4) Anode bag maintenance. (5) Cleaning and repacking of the filtering unit. (6) Complete removal of accumulated parts from bottom of tank after each working day. (7) *p*H adjustment and control.

Chromium Plating.—The development of automatic catalyst control has raised the operating efficiency of decorative chrome solutions. This advent has enabled the chrome tank operator to maintain his production schedule with a minimum amount of rejects. However, maximum productivity is greatly influenced by the covering and throwing power of the solution; therefore, the following applications aiding chrome coverage are necessary: (1) Adequate nickel deposits with optional activation dip. (2) Proper *p*H of nickel solution. (3) Electrolyze solution before operating. (4) Occasional hoeing up of the bath will insure completely dissolved salts. (5) Arrange the parts on the rack with due consideration to shading, burning and thieving. (6) Clean active anodes. (7) Sufficient current supply, with secured electrical connections. See Figs. 7 and 8.

Temperatures range from 100 to 130F. The lower limits favor maximum coverage, less current with corresponding lower plating speed, and easier burning at the edges. Higher temperatures permit higher current densities resulting in less burning and faster plating speed, thus providing the use of wider current densities when maximum throwing power is not required.

REFERENCE

"Finishing Zinc Base Die Castings," Metal Finishing, November and December 1958.

Nicholas Ananiatis is a plating foremen with the Nassau Chromium Company, Mineola, New York. His electroplating experience covers a period of 12 years. He studied electrochemistry at Brooklyn Tech, Brooklyn, N. Y., and also completed a course in business administration. He is a member of the American Electroplaters' Society.

USE OF SELENIC ACID FOR PLATING MICROCRACKED, PROTECTIVE AND DECORATIVE CHROMIUM PLATE

by W. H. SAFRANEK and R. W. HARDY*

Abstract

Improved corrosion performance has been obtained with decorative composites of bright nickel and chromium, by inducing microcracking in the chromium plate with the addition of selenic acid to the plating bath. With 0.8 mil of bright nickel and 0.055 mil of the microcracked chromium on one set of zinc die cast panels, no basis metal corrosion occurred during 144 hours of copper-accelerated salt spray. Conditions for depositing the microcracked chromium are detailed in this paper.

"MICROCRACKED CHROMIUM," defined in this paper as a chromium plate with a microscopic system of criss-crossing cracks, is a relatively new development stemming from the recent, almost revolutionary, impetus toward improved corrosion performance for electroplated parts. Microcracked chromium that is being deposited industrially over copper and bright nickel has been credited with a phenomenal improvement in corrosion performance. A new procedure for depositing chromium with a similar microcracked structure has been identified in the laboratory. It appears worthy of further investigation because it might prove to have economical advantages. With this new procedure, selenic acid is added in small concentrations to a conventional chromic acid bath.

Selenium compounds are employed as brighteners for several copper plating processes.[1, 2] Silver[3] and brass[4] also are brightened with selenium-containing addition agents. Selenates were used 20 years ago in one of the first bright nickel baths,[5] and are claimed to brighten zinc deposited in an acid solution.[6] A patent for chromic acid plating baths containing compounds of selenium and tellurium was issued in 1935.[7]

Cracks in rhodium plate were reduced in depth, and corrosion performance was improved by adding selenic acid to a rhodium sulfate bath.[8, 9] Because of these results, selenic acid additions to chromic acid plating solutions were investigated with the hope of producing corrosion-protective, crackfree plate. Shortly after this study was started, however, an abstract of a new British patent[10] was published. Examination of this patent revealed examples claiming that chromium as thick as 0.48 mil was deposited in a crackfree form in baths containing selenic acid. Two sets of conditions, differing principally in the selenic acid concentration, were given in the examples. Chromium deposited in the Battelle laboratories with the conditions disclosed for the lower selenic acid concentration was too dull for decorative applications. Increasing the selenic acid concentration only worsened the appearance of the plate. Furthermore, considerable porosity was detected in the chromium plate. A reduction in the bath temperature from 122 to 110F, however, resulted in smooth, bright plate with unusual properties.

*Battelle Memorial Institute, Columbus, Ohio.

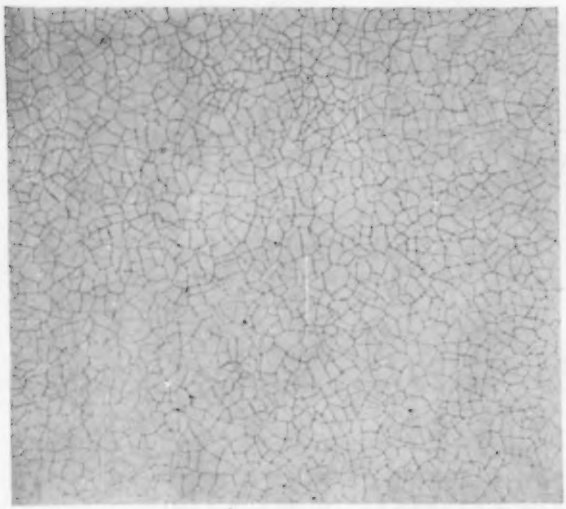

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Fig. 1. Surface photomicrograph showing uniform microcrack system of continuous cracks in chromium plate. Electrolytically etched ½ minute at 100 amp/sq ft in a solution containing 250 g/l CrO_3 and 2.5 g/l H_2SO_4.

EFFECTS OF CHANGES IN SELENIC ACID CONCENTRATION

Chromium plate, about 0.05 mil thick, deposited in a bath operated at *122F*, and containing 250 g/l chromic acid and 2.5 g/l sulfuric acid, appeared to be crackfree when etched and examined microscopically. Such plate did not remain crackfree when heated to 320F, however. After 0.007 g/l of selenic acid was added to the bath, subsequent chromium plates were microcracked. Furthermore, they were not as bright as the chromium plates obtained before the addition of selenic acid. A large number of discontinuities in the chromium plate and a further reduction in brightness were noted when the concentration of selenic acid was increased to 0.1 g/l.

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Fig. 2. Surface photomicrograph showing discontinuous microcracks in chromium plate. Electrolytically etched ½ minute at 100 amp/sq ft in a solution containing 250 g/l CrO_3 and 2.5 g/l H_2SO_4.

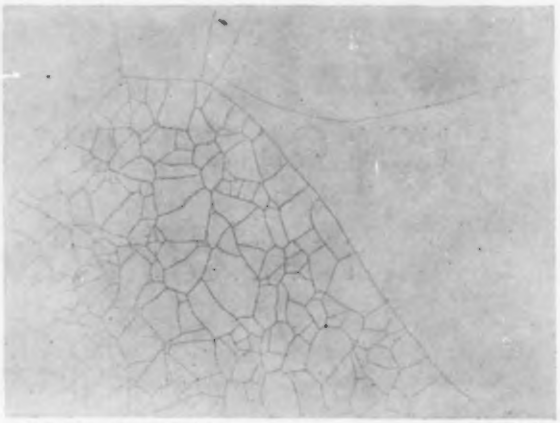

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Fig. 3. Surface photomicrograph showing nonuniform microcrack system in chromium plate. Electrolytically etched ½ minute at 100 amp/sq ft in a solution containing 250 g/l CrO_3 and 2.5 g/l H_2SO_4.

Bright chromium plate was obtained in a bath operated at *110F* when the selenic acid concentration was in the range of 0.007 to 0.02 g/l. Within this range, three different crack-structure systems were recognized when the chromium was etched electrolytically and examined under a microscope. Descriptions of these systems follow:

(1) A system of closely spaced, continuous microcracks, such as that shown in Fig. 1; this system contained about 1700 microcracks per linear inch.

(2) A system of discontinuous microcracks such as that shown in Fig. 2; this system contained more than 2000 microcracks per linear inch, but the cracks were not all joined together.

(3) A nonuniform microcracked system such as that shown in Fig. 3; in the areas of maximum crack density, the crack count was of the order of 700 microcracks per linear inch.

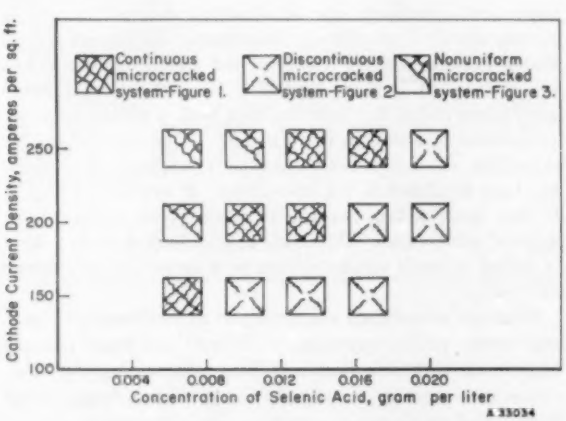
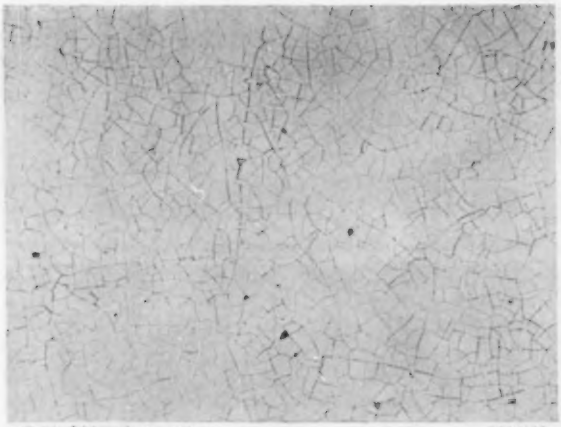


Fig. 4. Effects of varying selenic acid concentration and current density on crack structure of chromium plate.



Original Magnification 100× N64160

Fig. 5. Surface view of representative area of an SEB panel after 144 hours of CASS.

The relationships observed between the selenic acid concentration, the current density, and the type of microcrack system are designated graphically in Fig. 4. They show that the current density required for producing a continuous system of microcracking increased as the concentration of the selenic acid was increased. With a very low current density, the microcracks were discontinuous, as in Fig. 2. With a very high current density, the microcrack system was nonuniform, as in Fig. 3.

The microcracks could not be distinguished with the naked eye, of course. Nevertheless, a careful examination in bright daylight revealed a slight difference in the appearance of the chromium plate with the nonuniform crack system, by comparison with the other systems. Some areas of the plate with the nonuniform system appeared slightly brighter than the other areas.

EVALUATION IN ACCELERATED-CORROSION STUDIES

The corrosion performance of the experimental, microcracked chromium was evaluated in copper-accelerated salt spray (CASS) after plating 4 by 6-inch zinc, die cast panels with 0.4 mil of copper, 0.8 mil of bright nickel, and 0.05 to 0.06 mil of the microcracked chromium. Six panels, designated as Group SEB, were chromium plated with conditions to produce a continuous system of microcracks, as follows:

Chromic acid concentration	250 g/l
Sulfuric acid concentration	2.5 g/l
Selenic acid concentration	0.013 g/l
Cathode current density	225 amp/sq ft
Temperature	110 to 112F
Time	5 minutes

Six other panels, designated as Group SEA, were chromium plated with conditions that produced the nonuniform crack system in Fig. 3, as follows:

Chromic acid concentration	250 g/l
Sulfuric acid concentration	2.5 g/l
Selenic acid concentration	about 0.005 g/l
Cathode current density	150 amp/sq ft
Temperature	110 to 112F
Time	8 minutes

The procedure adopted for CASS corrosion testing corresponded to that described by Nixon, Thomas, and Hardesty.[11] The panels were cleaned with magnesium oxide prior to evaluation in CASS.

The 18-hour CASS period that is customary for electroplated die castings caused almost no visible evidence of basis metal or coating corrosion. A slight haze was noted on up to about 50 per cent of the area of each SEA and SEB panel. The haze was attributed to widening of the microcracks due to corrosion of the nickel under the cracks. The SEB panels were lightly stained, but no stain was observed on the SEA panels. One small blister was seen on one of the SEB panels.

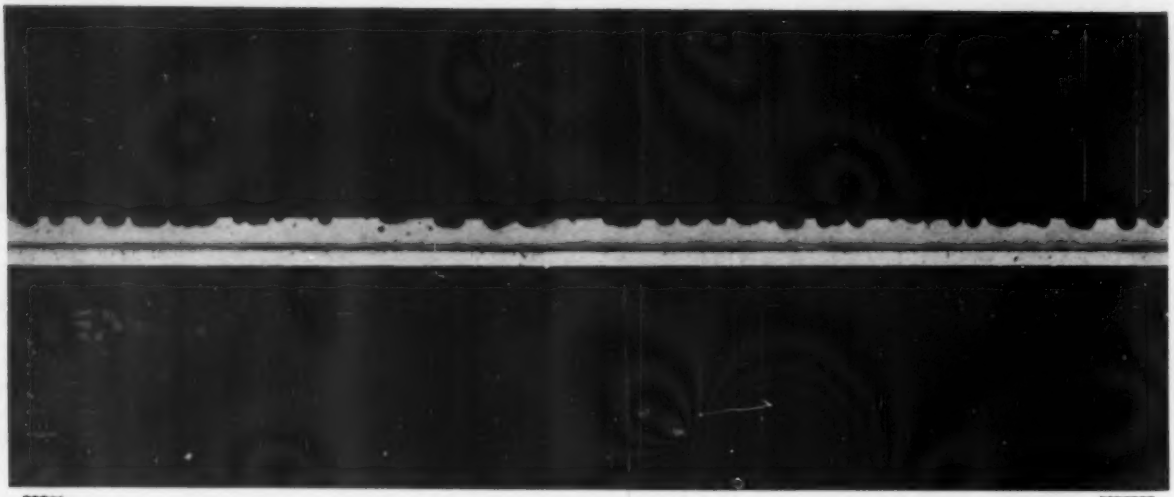
After a 36-hour CASS evaluation, the SEA and SEB panels showed no significant change by comparison with their appearance after 18 hours. After 72 hours of exposure, a light stain and haze were noted on all panels. The stain was removed from test areas by scrubbing with magnesium oxide, but the haze was not removed by scrubbing. The stain is attributed to nickel corrosion products.

Relatively minor changes occurred in the surface appearance of the SEB panels between 72 and 144 hours of CASS exposure. A magnified surface view of a representative SEB panel after 144 hours is shown in Fig. 5. The cross section in Fig. 6 illustrates the extent of nickel corrosion under the chromium. Cross sections of SEA panels had a similar appearance after 144 hours of CASS. One of the SEA panels had acquired eight small blisters, but no further evidence of basis metal corrosion was observed on the other panels.

DISCUSSION

The results of the laboratory study indicated that selenic acid additions to a conventional chromic acid bath promote a system of microcracks in chromium plate about 0.05 mil thick. The accelerated-salt-spray data showed that such chromium plate was much better than 0.01 mil of regular chromium in preventing basis metal corrosion when deposited over about 0.4 mil of copper and 0.8 mil of bright nickel. After only 18 hours of CASS, severe blistering has been observed in die castings plated with copper, bright nickel, and regular, 0.01-mil-thick chromium.[12]

When the thickness of chromium deposited in a conventional bath is increased to 0.05 mil, corrosion performance is improved, but not to the degree obtained with 0.05 mil of microcracked chromium. Ordinary chromium about 0.05 mil thick contains cracks that are visible to the unaided eye upon close inspection. These cracks are much wider than the cracks in a microcracked system. As a result of nickel corrosion under the macrocracks, unsightly crazing becomes apparent after 18 to 36 hours of CASS. Blisters in die castings that coincide with such cracks appear during 36 to 54 hours of CASS testing, depending on the thickness of the copper and the bright nickel plate.



200× N64133

Fig. 6. Representative cross section of an SEB panel after 144 hours of CASS. The etchant consisted of 70 per cent by volume of acetic acid and 30 per cent by volume of nitric acid.

The available data indicate that the corrosion performance of the microcracked chromium deposited experimentally with additions of selenic acid to the plating bath compares favorably with the performance of microcracked chromium deposited commercially by a two-step process. Control of the microcrack count, which appears to be important for controlling corrosion performance, has been relatively simple for chromium plating flat panels in baths containing selenic acid additions, whereas accelerated-corrosion testing and metallographic analyses of other panels and parts indicate a variability in the performance and microcrack count for chromium deposited in baths containing no selenic acid.

Like the microcracked chromium deposited commercially by the two-step process, microcracked chromium deposited in the selenic acid-containing bath appears to owe its efficacy to a type of sacrificial protection whereby nickel is slowly corroded under each microcrack in the chromium. Instead of corroding rapidly in depth as bright nickel does under pores in 0.01 mil of regular chromium, bright nickel under microcracked chromium appears to corrode preferentially in a lateral direction. The rate of lateral corrosion is relatively slow, however. Hence, microcracked chromium offers a distinctive advantage for improving the corrosion performance of nickel-plated parts.

The nickel corrosion that occurs under microcracked chromium is similar in some respects to the nickel corrosion that occurs in a composite of duplex nickel and 0.01 mil of regular chromium, which has been adopted widely for steel and zinc die castings.[13, 14] The outer 0.2 to 0.3-mil-thick layer of nickel slowly corrodes in each case. This behavior in duplex nickel-chromium composites has been attributed to a difference in the electrochemical activity of the "sulfur-containing" bright nickel overlay and the "sulfur-free" semibright nickel undercoat.

Although nickel corrodes somewhat similarly in both duplex nickel-regular chromium and bright nickel-microcracked chromium composites, a difference in the surface appearance of these composites has been observed by the authors. Whereas the surface of bright nickel-microcracked chromium composites slowly acquires a slight haze and light stain, macroscopic corrosion pits are formed in duplex nickel-regular chromium composites. To prevent such pitting, 0.04 to 0.05 mil of crackfree chromium has been proposed in place of regular chromium,[12] and several plants plating die castings have adopted this proposal. Crackfree plate that is porefree or nearly porefree is deposited in high-temperature, high-ratio baths and offers few or no sites for corrosion to begin. Nevertheless, the authors recognize that a composite of bright nickel and microcracked chromium might be capable of satisfactory protection at a lower cost.

RESISTANCE TO MACROCRACKING

Composites of bright nickel and microcracked chromium displayed far more resistance to crack propagation through the bright nickel coating when subjected to mechanical deformation or thermal stress, by comparison with composites of bright nickel and ordinary chromium. For example, bends that caused cracks to propagate completely through a composite of bright nickel and conventional chromium caused no significant crack continuation into bright nickel coatings plated with microcracked chromium. The narrow cracks in microcracked chromium did not appear to be changed as a result of bend stressing or heating to 320F. The macrocrack resistance of the microcracked chromium should be helpful for providing good corrosion performance for nickel- and chromium-plated parts subjected to mechanical deformation or thermal stress under service conditions.

CONCLUSION

Insufficient data are at hand to conclude that it is practical to use selenic acid industrially for producing microcracked chromium. An advantage appears possible for a single-step process that can deposit corrosion-protective, microcracked chromium in only five minutes of plating time. Outdoor-

weathering data for composites of nickel and microcracked chromium will be particularly important because it is necessary to determine whether a change in appearance due to haze and stain will occur, as was observed for the panels subjected to CASS. If the appearance changes outdoors, information on the rate and degree of such a change will be necessary for guiding the plating industry in selecting procedures for commercial applications. The authors plan to investigate the outdoor corrosion performance of microcracked chromium, the throwing power of the bath, and the selenic acid consumption rate during the course of future research. This paper is being published to encourage other investigators to study these and other aspects of the development.

ACKNOWLEDGMENTS

The Selenium and Tellurium Development Committee, for whom the research was conducted, is interested in encouraging the free and extensive use of this type of process if it proves to have commercial value.

REFERENCES

[1]Ostrow, B. D., U. S. Patent 2,694,677, November 16, 1954; Ostrow, B. D., U. S. Patent 2,732,336, January 24, 1956; Overcash, D. M., and R. B. Parks, U. S. Patent 2,373,483, March 6, 1956; Ostrow, B. D., U. S. Patent 2,770,587, November 13, 1956; Weiner, R., German Patent 1,002,179, February 7, 1957; Nobel, F. I., and B. D. Ostrow, U. S. Patent 2,783,194, February 26, 1957; Wernlund, C. J., U. S. Patent 2,825,684, March 4, 1958; Foulke, D. G., and O. Kardos, U. S. Patent 2,848,395, August 19, 1958; Passal, F., U. S. Patent 2,873,234, February 10, 1959; Passal, F., U. S. Patent 2,873,235, February 10, 1959; Foulke, D. G., O. Kardos, and H. Koretzky, U. S. Patents 2,881,121 and 2,881,122, April 7, 1959; McCoy, E. H., U. S. Patent 2,876,178, March 3, 1959; McLeod, H. G., U. S. Patent 2,913,376, November 17, 1959.

[2]"Level Plating—shortcut to a Shine," Chemical Week, June 28, 1958.

[3]Wolfson, H., and B. Thomson, U. S. Patent 2,613,179, October 7, 1952; Ostrow, B. D., U. S. Patent 2,777,810, January 15, 1957; Nobel, F. I., and B. D. Ostrow, U. S. Patent 2,783,194, February 26, 1957; Weiner, R., German Patent 1,002,179, February 7, 1957.

[4]Ostrow, B. D., and F. I. Nobel, U. S. Patent 2,817,627, December 24, 1957.

[5]Harshaw, W. J., and K. E. Long, U. S. Patent 2,125,229, July 26, 1938; Brown, Henry, U. S. Patent 2,211,535, August 13, 1940; Mougey, H. C. and R. J. Wirshing, U. S. Patent 2,238,529, January 4, 1944.

[6]Van Houten, G. R., U. S. Patent 2,729,602, January 3, 1956.

[7]Scott, W. W., A. A. Birsiri, and W. C. Gregory, U. S. Patent 1,993,186, March 5, 1935.

[8]Belgian Patent 557,396, May 31, 1957, to Mond Nickel Company.

[9]Reid, F. H., Trans. Inst. Metal Finishing, Spring, Part 3, 74 (1959).

[10]Fry, Hanno, British Patent 798,590, July 23, 1958.

[11]Nixon, C. F., J. D. Thomas, and D. W. Hardesty, Proc. Am. Electroplaters' Soc. **46,** 159 (1959).

[12]Safranek, W. H., C. L. Faust, and H. R. Miller, Proc. Am. Electroplaters Soc., **46,** 133 (1959).

[13]Du Rose, A. H., and W. J. Pierce, Metal Finishing, **57,** No. 3, 44 (1959).

[14]Caldwell, M. R., Inco Nickel Topics, **12,** No. 7 (1959).

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THE FREE CYANIDE ANALYSIS OF COPPER CYANIDE PLATING SOLUTIONS

by J. R. CRAIN*

IN ORDER TO OBTAIN good electrodeposits from a cyanide copper plating solution, the constituents of the solution must be maintained within optimum concentrations. One of the most important constituents of the cyanide copper plating solution is the "free" cyanide. The "free" cyanide is the potassium or sodium cyanide in excess of the amount necessary to form the cuprous complex. The "free" cyanide limits of a proprietary bath can be regulated to obtain some or to a degree all of the following advantages:

1. Non-porous and dense deposits.
2. High rate of metal deposition.
3. High cathodic and anodic efficiencies.
4. Satisfactory anode corrosion.
5. Bright plating within wide current density limits.

Although the anode corrosion is improved as the "free" cyanide content is increased, an excess over certain limits lowers the cathode efficiency. This must be avoided because low cathode efficiencies can result in deposits having inferior quality. An excessively high "free" cyanide content can reduce the bright plating range of certain proprietary solutions. While it is possible to obtain satisfactory deposits with a very low "free" cyanide content, a "free" cyanide content below certain limits is a cause of poor anode efficiency; a possible rapid depletion of the metal content of the solution; rough deposits in high current density areas; and spongy, matte deposits in low current density areas. Thus, cyanide copper plating solutions have been formulated from carefully regulated laboratory and commercial experiences with ranges of "free" cyanide to obtain the highest quality electrodeposits for specified conditions. Therefore, to consistently obtain high quality copper deposits, it is necessary to control the "free" cyanide with frequent periodic laboratory analysis.

The cold method of analysis commonly referred to as the ice method for the titration of the "free" cyanide in a cyanide copper plating solution has been widely accepted in industry. However, for many control laboratory installations, the cold method of titration has not been practical due to the conditions imposed for the analysis. It is believed that if the "free" cyanide could be titrated at room temperature under controlled conditions to give reproducible results, this method would be more widely used on an industrial basis than the cold method of titration.

The research program undertaken attempts to correlate data obtained by the two common analytical methods.

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ANALYTICAL PROCEDURE

Previous work indicated the "free" cyanide value will be changed with dilution, and a preliminary set of analyses was run using the cold method investigating the change in "free" cyanide value with dilution.

After an initial test on a cyanide copper plating solution containing 0.9 ounces per gallon "free" sodium cyanide to a temperature of 32C, it was decided to prepare three cyanide copper plating solutions containing varying amounts of "free" sodium cyanide. The cyanide copper plating solutions contained 11.5 ounces per gallon copper and 4.0 ounces per gallon sodium hydroxide, along with sufficient sodium cyanide to complex the copper and 0.5, 1.0 or 1.5 ounces per gallon free sodium cyanide. The solutions were prepared, carbon treated, filtered, and then analyzed by the cold method. If further additions of sodium cyanide were needed to give the desired "free" cyanide solution, the solution was again analyzed after the addition was made.

The following procedures were used for the analysis presented in this paper except where variations are otherwise noted.

Cold Method[1, 2]

1. Weigh accurately 40 grams cracked ice into a 250 ml Erlenmeyer flask.
2. Add 10 ml 10 per cent potassium iodide (KI) solution and 5 ml concentrated ammonium hydroxide (NH_4OH) solution with stirring.
3. Pipette 10 ml cyanide copper plating solution sample into the flask.
4. Titrate this solution with 0.1 normal silver nitrate ($AgNO_3$) solution so that the end point is observed when the solution is 3 to 5C. The end point is a distinct opalescence which remains for at least one minute.

Room Temperature Method[3, 4, 5]

1. Pipette 10 ml cyanide copper solution into a 250 ml Erlenmeyer flask.
2. Add 10 ml distilled water, 15 ml 10 per cent potassium iodide (KI) solution, and 5 ml concentrated ammonium hydroxide (NH_4OH) solution.
3. Titrate this solution with 0.1 normal silver nitrate ($AgNO_3$) solution until a distinct opalescence remains for at least one minute.

Calculations

1. Ounces per gallon free potassium cyanide = ml . O . IN $AgNO_3$ x 0.1742.
2. Ounces per gallon free sodium cyanide = ml . O . IN $AgNO_3$ x 0.1313.

TABLE I

EFFECT OF WATER DILUTION ON FREE CYANIDE VALUE

(Standard Cyanide Copper Plating Solutions)

0.63 oz/gal Free NaCN Solution			0.93 oz/gal Free NaCN Solution			1.44 oz/gal Free NaCN Solution		
End point Temp °C	Volume Water Added—ml	Free NaCN oz/gal	End point Temp °C	Volume Water Added—ml	Free NaCN oz/gal	End Point Temp °C	Volume Water Added—ml	Free NaCN oz/gal
4.4	0	0.59	4.0	0	0.91	4.4	0	1.43
4.6	10	0.62	4.2	10	0.96	5.0	20	1.55
4.4	20	0.64	4.2	20	0.99	4.4	60	1.67
3.8	30	0.64	4.8	30	1.03	4.4	40	1.61
3.8	40	0.67	4.4	40	1.10	3.4	80	1.64
4.4	50	0.72	4.4	60	1.10	4.6	80	1.74
4.2	60	0.74	4.2	80	1.16	4.4	70	1.68
4.2	70	0.72	4.4	60	1.12	3.8	50	1.67
4.4	80	0.72	4.6	50	1.08			
4.8	30	0.66	4.2	70	1.13			
4.6	40	0.68	4.2	40	1.04			
4.4	70	0.71						
4.6	50	0.72						
4.6	70	0.73						
4.6	80	0.80						

RESULTS AND DISCUSSION

Dilution of Analytical Sample with Water

Large variations have been noticed among the analytical results of several operators who were unfamiliar with the cold method. The errors could have been introduced by inaccurate measurement of the ice required and in some instances by water which was being added directly to the analytical solution in order to melt the ice and raise the end point temperature to the recommended 3 to 5C.

In this work, measured additions of distilled water were made to the analytical solution containing the 40 grams of ice required in order to determine whether or not such additions introduced an error in the "free" cyanide content. In all cases, the resultant solution was titrated in order to reach the end point as closely to 4.0C as possible. The results of these analyses are recorded in Table I and plotted in Fig. 1.

Dilution of Analytical Sample with Ice

Since a measured addition of distilled water to the analytical solution resulted in an increase in the "free" cyanide value, it would seem that any error in weighing the required 40 grams of ice would also affect the free cyanide value. Analyses were conducted on the same three cyanide copper plating solutions with ice additions in excess of the 40 grams required. It became apparent in these experiments that maintaining the end point temperature at 3 to 5C necessitated melting most of the ice before titration, thus this dilution problem reverts to the water dilution problem. The results obtained with ice dilution are essentially the same as those obtained with water dilution. The results are recorded in Table II and Fig. 2.

Dilution of the analytical sample with ice produces an increase in the titrated value for the "free" cyanide in the cyanide copper plating solution. The curves plotted in Fig. 2 are parallel and tend to follow the curves plotted from the data on water dilution.

The formation of the tri-complex in solution with an excess of cyanide produces:

$$Cu_2(CN)_2 + 4CN^- \rightleftharpoons [Cu_2(CN)_6^{-4}]$$

This solution will not contain any appreciable number of cuprous ions. However, in the absence of an excess of cyanide ions, dissociation of the complex takes place:

$$[Cu_2(CN)_6^{-4}] \rightleftharpoons Cu_2^{++} + 6CN^-$$

with the ionization increasing as the solution is diluted.[6]

Upon dilution of the analytical sample, the excess of cyanide ions is reduced to the point where sufficient ionization takes place to increase the total "free" cyanide value. Actually none of the cyanide ions have been removed; it is only that the concentration of cyanide ions per milliliter would be reduced by dilution resulting in ionization of the complex to produce equilibrium again. The resultant ionization due to

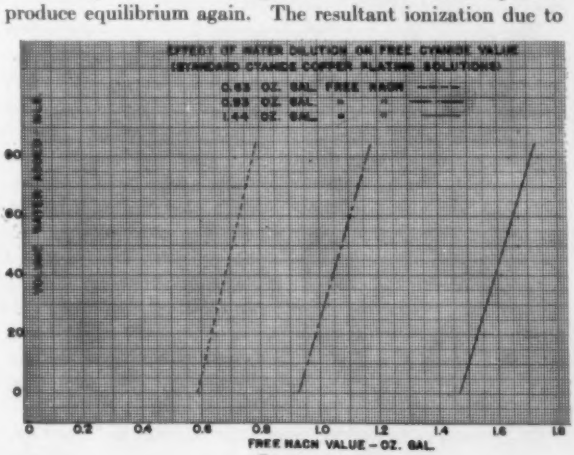

Fig. 1.

TABLE II

EFFECT OF ICE DILUTION ON FREE CYANIDE VALUE

(Standard Cyanide Copper Plating Solutions)

0.63 oz/gal Free NaCN Solution			0.93 oz/gal Free NaCN Solution			1.44 oz/gal Free NaCN Solution		
End point Temp °C	Total Ice Added—g	Free NaCN oz/gal	End point Temp °C	Total Ice Added—g	Free NaCN oz/gal	End point Temp °C	Total Ice Added—g	Free NaCN oz/gal
4.4	40	0.59	4.0	40	0.91	4.4	40	1.43
3.6	80	0.72	4.0	80	1.08	5.0	100	1.61
3.8	100	0.72	4.2	100	1.11	3.0	120	1.65
3.6	120	0.84	4.0	120	1.11	3.0	140	1.67
3.8	140	0.80	4.4	140	1.25	6.4	20	1.38
4.2	60	0.66	4.8	20	0.83	4.8	60	1.55
4.2	20	0.46	3.4	60	1.01	3.8	80	1.55
4.4	100	0.77	3.8	120	1.12	4.0	60	1.48
4.2	120	0.83	3.8	140	1.77			

water dilution would produce a greater total "free" cyanide titration value.

Effect of End Point Temperature on Free Cyanide Value

This analytical work was initiated in an attempt to correlate the results obtained by analyzing the same standard "free" cyanide copper plating solutions by the room temperature and cold methods. A common practice has been to analyze by the room temperature method and assume that this "free" cyanide titration value is approximately 0.4 ounces per gallon higher than the value obtained using the cold method. Differences in end point temperatures cause variations in the "free" cyanide analysis. Control of the plating solution using this method may result in inferior deposits. As the work continued, it became apparent that several solutions of different "free" cyanide values should be analyzed at various temperatures. With this information, a correlation between the two methods may be established.

For the most accurate value of "free" cyanide in a cyanide copper plating solution, the cold method is recommended.[1, 2] Analysis of a cyanide copper plating solution by this method will check within a few per cent of the calculated value, whereas an analysis by the room temperature method will result in a much higher value of "free" cyanide.

The original data was obtained using a 0.9 ounce per gallon "free" sodium cyanide copper plating solution analyzed by the room temperature method from 4 to 32C; but as this work progressed, it became apparent that it would be interesting to study the end point temperature affect on the "free" cyanide value up to the plating bath operating temperatures.

To obtain the "free" cyanide value below room temperature, the analytical solutions were cooled before titration. A constant temperature water bath was used to maintain the analytical solution at a definite temperature for the above room temperature titrations. It was assumed at any specific temperature, before the titration commenced, that the equilibrium of the dissociation of the tri-complex, $Na_2CU(CN)_3$, into the di-complex, $NaCu(CN)_2$, and sodium cyanide had been reached for that specific temperature. The analytical results are tabulated in Table III and plotted in Fig. 3.

The curves indicate that a greater increase in "free" cyanide value will be observed with a small increase in temperature at the higher solution temperatures than a correspondingly small increase at the lower temperatures. It is also apparent from these curves that the initial concentration of "free" cyanide does not have any effect on the increase of "free" cyanide per degree rise in temperature. These trends may be satisfactorily explained by examining the behavior of the cuprous cyanide complexes in solution.

It is generally assumed[7–10] cyanide copper plating solutions are prepared on the basis that the chief metal-bearing complex in solution is the tri-complex, $Cu(CN)_3^=$. In order to explain an increase in the "free" cyanide value of a solution with temperature, the dissociation equation should be examined carefully.

The dissociation occurs as follows:

$$Cu(CN)_3^= \overset{\Delta}{\rightleftharpoons} Cu(CN)_2^- + CN^-$$

It has been reported[4, 5, 11] that the rate of dissociation of the tri-complex to the di-complex will increase with increasing temperatures. This increase rate of dissociation provides more "free" cyanide in the solution; but, of course, it must be realized that the dissociation will reach an equilibrium if the solution is maintained for a certain length of time at a

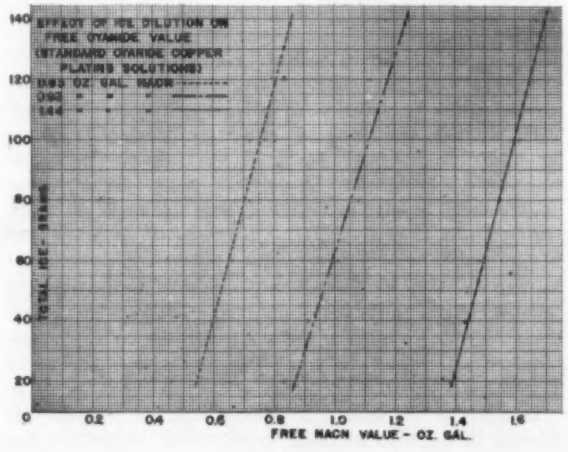

Fig. 2

specific temperature. In this work, an attempt was made to maintain the analytical solution at a given temperature for sufficient time in order for the reaction equilibrium to be reached. The dissociation of the tri-complex to liberate "free" cyanide with increased temperature partially explains the increase in "free" cyanide value.

The mechanism of the analytical reaction of removal of the cyanide ion with the addition of silver ions must also be examined. The addition of silver ions immediately removes cyanide ions by forming a complex silver cyanide compound resulting in a disruption of the dissociation equilibrium at any given temperature. With the removal of the cyanide ions, more tri-complex will dissociate in attempting to maintain the dissociation equilibrium. The increase from this source is a titration error and can be partially reduced by adding the silver ion solution rapidly.

The removal of cyanide ions by the addition of silver ions producing further dissociation occurs at any temperature, but the rate at which the tri-complex dissociates liberating cyanide ions increases with temperature. Therefore, the titration error due to this dissociation using the cold method probably could be negligible. The dissociation rate usually increases exponentially with temperature which introduces more deviation into the "free" cyanide value obtained at the higher temperatures. The greater difference in "free" cyanide value per degree rise in temperature at the higher

TABLE III

EFFECT OF END POINT TEMPERATURE ON FREE CYANIDE VALUE

(Standard Cyanide Copper Plating Solutions)

0.63 oz/gal Free NaCN Solution		0.93 oz/gal Free NaCN Solution		0.90 oz/gal Free NaCN Solution		1.44 oz/gal Free NaCN Solution	
End point Temp °C	Free NaCN oz/gal	End point Temp °C	Free NaCN oz/gal	End point Temp °C	Free NaCN oz/gal	End point Temp °C	Free NaCN oz/gal
4.8	0.60	4.2	1.06	4.0	1.06		
				8.0	1.00	2.2	1.63
11.6	0.77	4.6	1.08	9.0	1.08	3.4	1.44
				9.2	1.08	4.2	1.76
12.2	0.77	6.2	1.17	9.5	1.12	6.0	1.60
				10.5	1.14	6.0	1.79
14.6	0.82	12.2	1.18	11.0	1.13	13.8	1.84
				11.0	1.06	14.2	1.88
15.6	0.82	15.6	1.22	11.5	1.08	16.2	1.85
				12.0	1.12	16.6	1.92
17.6	0.89	17.8	1.29	13.0	1.12	18.6	1.97
				15.0	1.16	19.4	1.96
21.6	0.97	21.6	1.33	15.5	1.18	22.4	2.02
				16.0	1.17	22.8	2.06
25.0	1.05	25.0	1.44	16.0	1.18	24.2	2.05
				17.0	1.18	24.6	2.09
29.2	1.13	32.2	1.58	17.0	1.18	20.2	1.98
				19.0	1.21	29.8	2.19
33.6	1.21	38.8	1.71	19.0	1.25	31.2	2.21
				21.0	1.27	33.2	2.31
38.2	1.35	42.6	1.84	21.0	1.30	34.6	2.21
				21.5	1.30	37.2	2.36
44.8	1.56	52.2	2.23	21.5	1.27	38.6	2.38
				23.0	1.30	39.2	2.47
46.2	1.58	56.2	2.38	23.5	1.31	39.4	2.42
				23.6	1.39	48.2	2.63
51.4	1.81	58.2	2.44	24.0	1.34	48.2	2.68
				24.4	1.27	53.8	2.95
58.8	2.13	65.6	2.72	25.0	1.37	54.2	2.82
				25.0	1.31	54.4	2.90
61.8	2.21	67.0	2.85	25.6	1.37	56.6	3.11
				28.0	1.40	57.2	3.05
68.5	2.55	68.2	2.90	28.6	1.44	58.4	3.28
				31.6	1.47	60.6	3.27
72.8	2.76	74.6	3.28	31.8	1.51	61.9	3.20
						62.0	3.24
77.4	3.01	77.4	3.28			69.4	3.68
						74.4	3.93
						7.6	1.82

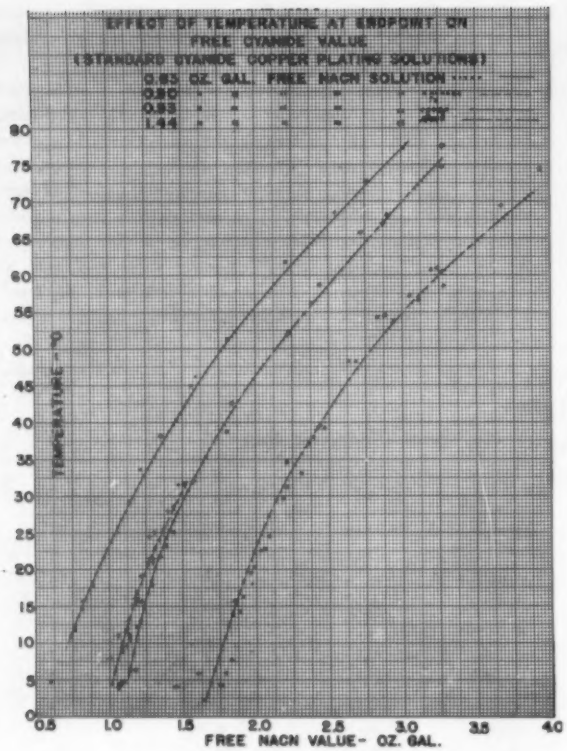
EFFECT OF TEMPERATURE AT ENDPOINT ON
FREE CYANIDE VALUE
(STANDARD CYANIDE COPPER PLATING SOLUTIONS)
TEMPERATURE - °F
FREE NaCN VALUE - OZ. GAL.

Fig. 3

temperatures, as shown by the curves in Fig. 3, may be the result of this increased dissociation rate.

It is also possible that at the higher temperature another dissociation reaction may occur. This is the dissociation of the di-complex into cuprous cyanide and cyanide ions.

$$Cu(CN)_2^- \overset{\Delta}{\rightleftharpoons} CuCN + CN^{-1}$$

In any event, this reaction cannot be overlooked since the concentration of the di-complex is increasing as the dissociation of the tri-complex proceeds. This would further complicate the problem with two sources of cyanide ions and two different copper cyanide complexes which would dissociate at different rates with increased temperature. It would seem improbable that the second dissociation would occur at the lower temperatures. This may explain the more rapid increase in the "free" cyanide value per degree rise in temperature above 45C. In all probability if this second dissociation were to occur, a slightly cloudy solution would be observed during the time the solution is maintained at the higher temperature before titration. It had been noticed, preceding the addition of the silver nitrate solution, that several analytical solutions at the higher temperatures did appear cloudy. This cloudiness could have been produced by the formation of the insoluble cuprous cyanide from the second dissociation reaction.

It must be pointed out that the end point at the higher temperatures was somewhat more difficult to detect than at the lower temperatures. The increased amount of silver nitrate solution needed for the titration at the higher temperatures necessarily increased the titration time. It is possible that the increased addition time could introduce titration errors.

CONCLUSIONS

The "free" cyanide content has been determined with changes in the concentration of the components by dilution and the temperature of the solutions. The fellowing results were obtained:

1. Dilution of solutions containing complex copper cyanide ions increase the "free" cyanide content, i.e., the complex ions partially dissociate.

2. At higher temperatures, the "free" cyanide content is increased; i.e., the cuprous complex ions are partially dissociated.

3. Cyanide copper plating solutions prepared to contain 0.5, 1.0, and 1.5 ounces per gallon "free" cyanide will contain respectively approximately 3.0, 3.5, and 4.0 ounces per gallon "free" cyanide at a solution operating temperature of 75C.

4. Although it may be possible to control the "free" cyanide content of a cyanide copper plating solution by the room temperature method considering that this value is 0.4 to 0.6 ounce per gallon high, a most precise analytical control can be obtained with the cold method.

REFERENCES

[1]"Coppralyte Copper Plating Chemicals, Operating Instructions for Potassium and Sodium Formulations," Electrochemicals Department, E. I. duPont deNemours & Company, Inc., Wilmington 98, Delaware.

[2]"Instruction Manual for Use of Wes-X and PR Current in Cyanide Copper Plating," Electroplating Projects Department, Westinghouse Electric Corporation, East Pittsburgh, Pa.

[3]"Technical Instructions for the Hanson-Van Winkle-Munning Wes-X Bright Copper Plating Process with PR Current or Direct Current Plating," Hanson-Van Winkle-Munning Company, Matawan, N. J.

[4]Graham, A. K. and H. J. Read, "Modern Electroplating," Trans. Electrochem. Soc.," P. 185 (1942).

[5]Gray, Allen G., "Modern Electroplating," Chapter 8, John Wiley & Sons, New York, 1953, 1st Edition.

[6]Treadwell, F. P., and W. T. Hall, "Analytical Chemistry," Vol. I, P. 130-131, John Wiley & Sons, New York, 9th Edition.

[7]Thompson, M. R., "Trans. Electrochem. Soc.," **79**, 417 (1941).

[8]Petrocelli, J. V., "Trans. Electrochem. Soc.," **77**, 133 (1940).

[9]Wagner, R. M., and M. M. Beckwith, "Proc. Am. Electroplaters' Soc.," P. 147 (1938).

[10]Pan, L. C., "Electrochem. Soc.," **68**, 471 (1935).

[11]Blum, W., and G. Hogaboom, "Principles of Electroplating and Electroforming," McGraw-Hill Book Company, Inc., 1949, 3rd Edition.

James R. Crain received his BS degree in chemistry in 1948 from Juniata College and an MS degree in chemistry at Carnegie Institute of Technology in 1951. From 1950 to 1952, he was employed as a Junior Fellow at the Mellon Institute of Industrial Research. Since the fall of 1952, Mr. Crain has been an engineer in the Electroplating Projects Department, Westinghouse Electric Corporation. Mr. Crain is a Past President of the Pittsburgh Branch of the American Electroplaters' Society.

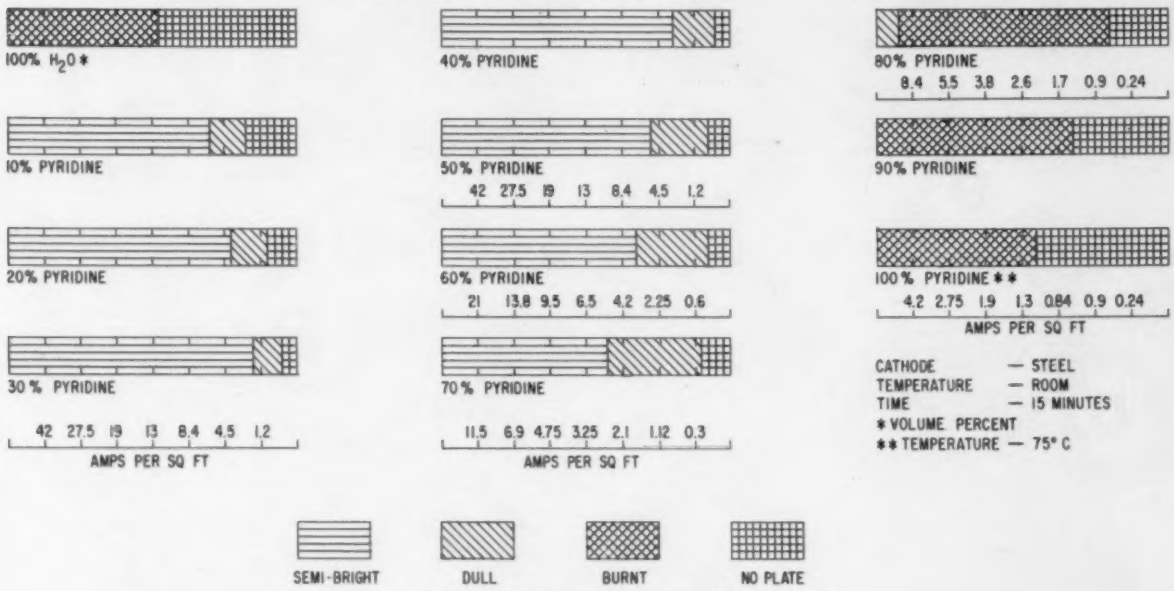

Fig. 1. Hull-cell data for the cadmium-pyridine solutions.

PROGRESS TOWARD THE DEVELOPMENT OF A NONEMBRITTLING CADMIUM ELECTROPLATING PROCESS

V. The Use of Pyridine as a Complexing Agent In Cadmium Plating Solutions

by S. W. STRAUSS AND P. N. VLANNES*

ABSTRACT

Non-cyanide aqueous baths containing pyridine were investigated for their characteristics in plating cadmium on ultra-high-strength steel. Plating evaluation included Hull-cell tests, throwing power and current efficiency determinations, embrittlement characteristics, and bath life in continuous plating. The current efficiency of the cadmium-pyridine bath approaches 100 per cent, and the throwing power approaches that of the cyanide bath at small distance ratios of far-to-near cathode. Results of delayed fracture tests indicate that the cadmium-pyridine bath is non-embrittling.

INTRODUCTION

IN THE DEVELOPMENT of aqueous cadmium baths which are fundamentally different from the cyanide bath, possible complexing agents being considered for cadmium include open-chain compounds such as the aliphatic amino acids, and closed-chain (ring) compounds such as the heterocyclic compounds. Two of the previous papers in this series[1, 2] were concerned mainly with the use of amino acids and triethanolamine as complexing agents in aqueous cadmium baths. The present paper gives results obtained by using the cyclic tertiary amine, pyridine, as the complexing agent for cadmium.

SCREENING EXPERIMENTS

The method used for a preliminary evaluation of heterocyclic compounds which could conceivably act as suitable complexing agents for cadmium was the same as that reported in an earlier paper in this series.[1] Of the compounds studied including pyridine, alpha and gamma picoline, quinoline and isoquinoline, pyridine appeared to be one of the more promising complexing agents for cadmium. Additional exploratory experiments were performed in which plating was conducted at temperatures from about 0C to the boiling points of the pyridine solutions. It was found that very little was gained by plating above room temperature, or by using cadmium concentrations greater than 1 M/l.

CURRENT DENSITY CHARACTERISTICS

The Hull-cell method was used to obtain current density characteristics.[1, 3] The data in Fig. 1 indicate that the plating latitude increases with an increase in pyridine content up to about 30 volume per cent of pyridine, after which the plating latitude decreases with further additions of pyridine; an acceptable plate was not obtained above about 80 volume per cent of pyridine. At 30 volume per cent of pyridine, the optimum plating conditions (about 12.8–15 amp per sq ft) yielded a semi-bright deposit. The electrical conductivities of the solutions decreased with increase in pyridine content.

The effect upon plating characteristics produced by adding 10 ml/l of benzenesulfonic acid or 0.1 g/l of each of the follow-

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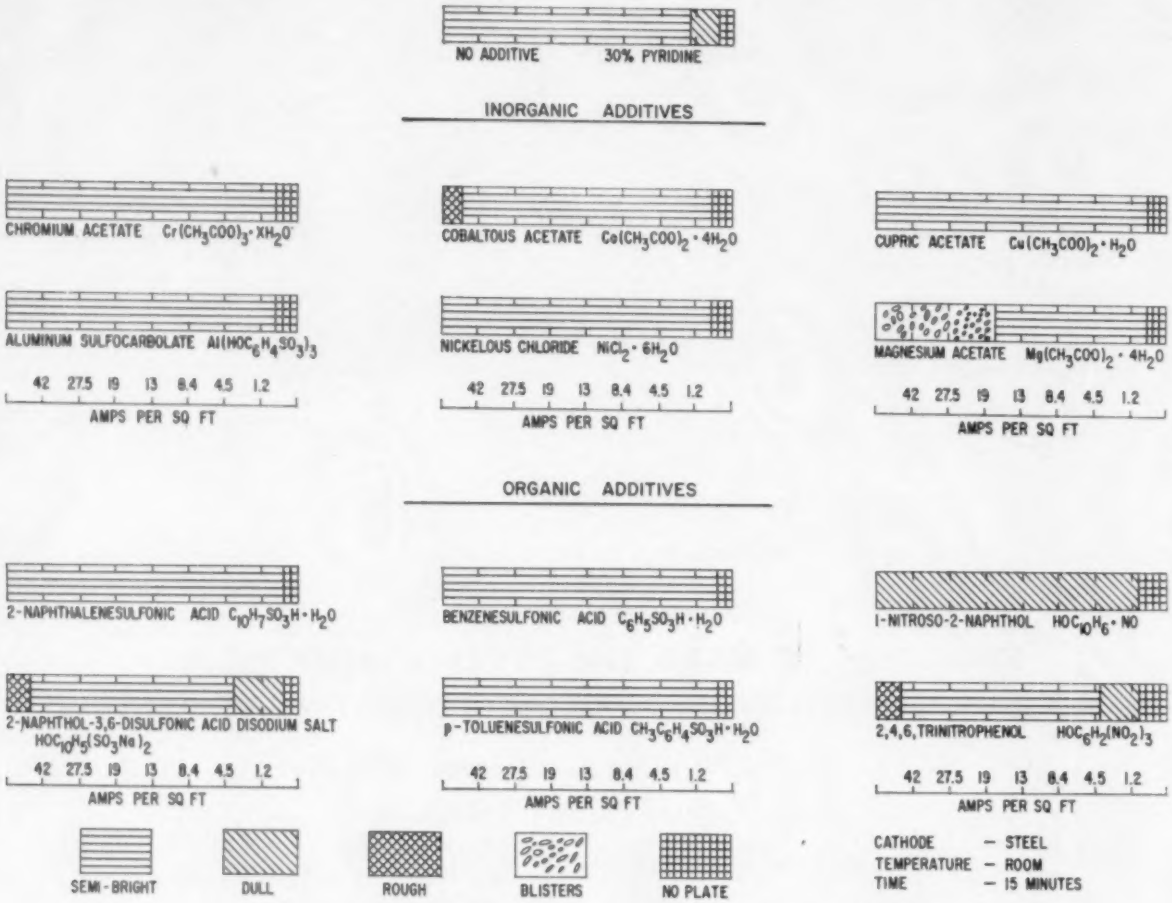

Fig. 2. Hull-cell data for the cadmium-pyridine solutions with various additives.

ing materials to the bath was investigated: chromic acetate, cobaltous acetate, cupric acetate, magnesium acetate, nickelous acetate, aluminum sulfocarbolate, 2-naphthalenesulfonic acid, 2-naphthol-3, 6-disulfonic acid disodium salt, p-toluenesulfonic acid, 1-nitroso-2-naphthol, and 2,4,6-trinitrophenol. The data in Fig. 2 indicate that, in general, these additives did not alter the plating latitude to any appreciable extent. However, chromic acetate, nickelous acetate, 2-napththalenesulfonic acid, and p-toluenesulfonic acid did improve the appearance of the plate.

CURRENT EFFICIENCY AND THROWING POWER

Plating bath 318 (Table I) was used for the current efficiency and throwing power studies; the current density was 12.8 amp per sq ft.

The procedure used to determine cathode and anode efficiencies was essentially that of Bloom and Hogaboom.[4, 5] It was found that the average current efficiency of this bath approached 100 per cent.

Throwing power determinations were made using a modified Haring-Blum cell.[1, 6] Deposits on the two cathodes were weighed and the throwing power expressed as milligrams of deposit on the far cathode per 100 milligrams of deposit on the near cathode. The results are shown in Fig. 3, and the curve for the cyanide bath[1] is included for comparative purposes. The curve for the throwing power of the pyridine bath tends to approach that of the cyanide bath such that they would meet at a far-to-near cathode distance ratio of about 1.6.

CONTINUOUS PLATING CHARACTERISTICS

Pyridine bath 318 (Table I) was subjected to continuous tank plating at room temperature. The results showed that it was possible to plate from this bath 24 hours a day for at least 30 days by maintaining a constant volume of solution by the periodic addition of water and pyridine, and renewal of the cadmium anodes.

EMBRITTLEMENT CHARACTERISTICS

The delayed fracture test and the method of evaluating the results were described in previous papers.[1, 5, 7] As in the case of the methanol-triethanolamine bath,[5] some specimens were tested under even more severe conditions in which the bars were plated while in tension at 75 per cent of the notched tensile strength of the unplated bar, and then kept under stress for the 100-hour test period. The composition of the baths used and the delayed fracture data are given in Table I. The delayed fracture data show that (a) the addition of a small quantity of 2-naphthalenesulfonic acid reduces the average holding time of the plated tensile bars, and (b) all 14

TABLE I

DELAYED FRACTURE TESTS FOR THE AQUEOUS PYRIDINE BATH[1]

Bath	Bath Number	Cadmium M/l	Pyridine (vol. %)	Additive	SURVIVAL TIME OF BARS: Less Than 100 Hours — Average Survival Time (hrs)	No. of Bars	Per Cent	100 Hours or More — No. of Bars	Per Cent
Pyridine	318	1	30	—	—	—	—	11	100
	318	1	30	—	—	—	—	3[2]	100
	319	1	30	NSA[3]	15	3[2]	100	—	—
Cyanide[4]	—	—	—	—	0	15	100	—	—

[1]Specimens were AISI 4340 steel heat treated to 285,000 psi ultimate tensile strength. Root radius of notch 0.001 inch.
[2]Unplated specimens placed in tension at 75 per cent of the notched tensile strength of the unplated bar, plated under stress, and kept under stress for the 100-hour test period. Plating was done at room temperature.
[3]0.1 g l of 2-naphthalenesulfonic acid (NSA) added to the pyridine bath.
[4]Cyanide bath: 3.5 oz cadmium oxide and 17 oz NaCN per gal, and 12 oz per 100 gal of R. O. Hull Co-20XL brightener. Specimens broke on loading between 40–70 per cent of notched tensile strength of the unplated bar.

bars that were plated from the additive-free pyridine bath survived the 100-hour test. These results show that the pyridine bath, like the triethanolamine,[2] methanol, and methanol-triethanolamine[5] baths, fulfills the criteria for nonembrittlement as set forth in this series of papers.

SUMMARY

(1) The plating characteristics of the cadmium-pyridine bath with and without additives, have been investigated. The best plates (semi-bright) were obtained from an aqueous solution containing 1 M/l of cadmium and 30 volume per cent of pyridine.

(2) The current efficiency of this bath approaches 100 per cent.

(3) The throwing power of the bath approaches that of the cyanide bath at small distance ratios of far-to-near cathode.

(4) Continuous tank plating at room temperature showed that it was possible to plate from the aqueous cadmium-pyridine bath 24 hours a day for at least 30 days without attention, except for maintaining a constant volume of solution by periodic addition of water and pyridine and renewal of the cadmium anodes.

(5) Results of delayed fracture tests, using plated cylindrical notched specimens of AISI 4340 steel heat treated to approximately 285,000 psi ultimate tensile strength, and subjected to an applied load of 75 per cent of the notched tensile strength of the unplated specimen, indicate that the aqueous cadmium-pyridine bath is nonembrittling.

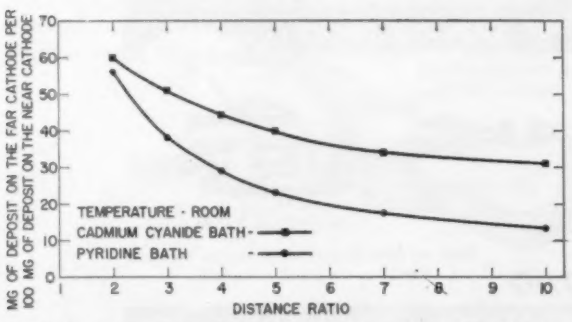

Fig. 3. Throwing power evaluation of the cadmium-pyridine bath.

REFERENCES

[1]Vlannes, P. N., and S. W. Strauss, "Progress Toward the Development of a Nonembrittling Cadmium Electroplating Process II. Use of Aliphatic Amino Acids as Complexing Agents in Aqueous Baths," Plating **46,** 1046–1051 (1959).

[2]Vlannes, P. N., S. W. Strauss and B. F. Brown, "Progress Toward the Development of a Nonembrittling Cadmium Electroplating Process III. The use of Triethanolamine in Cadmium Plating Solutions," Plating **46,** 1153–1157 (1959).

[3]Hull, R. O., Proc. Am. Electroplaters' Soc. **27,** 52 (1939); Monthly Rev. Am. Electroplaters' Soc. **26,** 753 (1939).

[4]Blum, W., and G. B. Hogaboom, Electroplating and Electroforming, McGraw-Hill Book Co., Inc., New York (1949).

[5]Strauss, S. W., and P. N. Vlannes, "Progress Toward the Development of a Nonembrittling Cadmium Electroplating Process IV. Use of Methanol as a Solvent in Cadmium Plating Solutions," Plating **47,** 926–932 (1960).

[6]Haring, H. E., and W. Blum, Trans. Am. Electrochem. Soc. **44,** 313 (1923).

[7]Raring, R. H., and J. A. Rinebolt, "A Small and Inexpensive Device for Sustained Loading Testing," ASTM Bull. No. 213, pp. 74–76 (April 1956).

S. W. Strauss is presently Head, Chemical Metallurgy Section of the Physical Metallurgy Branch, U. S. Naval Research Laboratory. He held research positions at the National Bureau of Standards and at the Polytechnic Institute of Brooklyn. He received his BS, MS and PhD degrees in chemistry from the Polytechnic Institute of Brooklyn.

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BOOKS

Remittance must accompany all book orders placed with AES Headquarters.

TIN AND ITS ALLOYS, edited by E. S. Hedges and published by Edward Arnold, Ltd., London, 1960. 432 pages. Nonmembers $27.50, AES Members $25.00.

Tin and Its Alloys deals with properties and applications. The talents of five current or former members of the staff of Tin Research Institute are combined in this comprehensive, beautifully printed collection of information. Its eleven individual chapters are styled similarly, despite differences in subject matter. Fundamentals, theory and practical aspects are given equal attention, insofar as possible. Major applications of tin are detailed in understandable and concise, yet accurate, terms that avoid complex technical jargon. Comprehensive, but not complete, reference lists are given at the end of each chapter for the benefit of readers interested in pursuing specific technical aspects in greater detail.

The introductory chapter and another, which were prepared by the editor, typify the refreshing, easy-to-read style adopted by most of the contributors. The *history* of tin, its *variety of uses* and even *statistical information on production and consumption* are presented in a fashion that is as interesting and stimulating as many best-selling novels. Hedges' correlation of information on chemical behavior with specific applications is organized in a logical manner that would be appropriate for other authors to adopt.

Hot tinning and *tinplate manufacture* are described expertly by W. E. Hoare. His technical explanations of tinning arts that date back to ancient times is interesting and logical, and his account of modern tinning procedures is comprehensive, yet fascinating. Accuracy in facts on electrolytic coatings is apparent. Ferrostan, Halogen, alkaline stannate, and continuous hot dip tinning lines are described in detail; the text is supplemented with appropriate diagrams and photographs. The influence of specific factors on solderability, lacquering characteristics and corrosion behavior, which has been interpreted mistakenly in certain previous works, is treated accurately, yet simply, in Hoare's chapter on tinplate. For example, electrolytic tinplate surfaces are heat-flowed to improve their solderability and not to reduce their porosity, as claimed by other writers.

Solders, pewter, foil, tubing and *pipe* are covered extensively in two chapters by W. R. Lewis, which include reports on the roles of lead, antimony, copper, silver and phosphortin in solders, nine methods of soldering common metals and special methods for "difficult-to-solder" metals. The chemical reactions for fluxing and soldering are explained understandably and interestingly. Applications for auto bodies, electric motor armatures, tin cans, telephone circuits and electronic devices (including printed circuits) are detailed, but supplemental references are sparse.

A chapter on *physical metallurgy*, a detailed account of *tin alloy bearings* and a chapter on *tin, die cast alloys* were prepared by E. C. Ellwood. The allotropic transformation of tin is handled interestingly in some detail and the role of intermetallic compounds of tin is aptly treated in the discussion of the metallurgy of tin alloys. The comprehensive data for bearings covers high-tin, lead-tin, intermediate-tin and aluminum-tin alloys. Infiltered bearings consisting of a matrix of copper-nickel alloy and a lead-tin alloy infiltrate are discussed. Compositions, properties, bearing characteristics and casting procedures are correlated to some degree. The influence of phase relationships on bearing characteristics is beautifully illustrated with photomicrographs.

In the chapter on *die cast alloys* and *die casting techniques*, centrifugal casting in rubber molds is described in some detail, but the properties of the die cast alloys seem to have been overlooked. On the other hand, the properties of fusible alloys used for safety appliances, seals, tube bending, cloth dyeing and other purposes are treated rather broadly. (Much of this information could have been correlated in tables with alloy compositions.) Data on the lead-rich, tin antimony alloys employed for monotype, linotype, cast type and sterotype and the silver-tin dental alloys also are detailed.

Bronzes, by J. W. Cuthbertson, are treated logically and interestingly. His account of their metallography includes several excellent photomicrographs. Melting and casting procedures and effects of heat treatments and working are detailed. Compositions and properties are correlated with applications. Information on ternary and quaternary alloys containing manganese, beryllium, lead and/or zinc is introduced, but not expanded.

The chapter on *electrodeposited tin and its alloys* is inadequate. Often awkward and occasionally inaccurate, the phraseology in this chapter does not match the high standard set in the other chapters. The lack of information in certain areas of alloy development since about 1954 is unfortunate. Data that could have been treated concisely in tabulated form are either missing or buried in long sentences. The extensive reference list at the end of the chapter includes none dated after 1956. Chemistry is emphasized, and metallurgical data are meager. Yet, until *Modern Electroplating* is revised, this chapter will be the only single source known to the reviewer that deals comprehensively with tin, tin-copper, tin-zinc, tin-nickel, tin-lead, tin-cadmium and other tin-alloy electrodeposits.

Although the book contains 80 tables, tabulated data are rather meager in some cases. The reader must frequently turn pages to correlate the information on one page with data on others. Integration and correlation is not up to the standard that would be expected in such a work. A lack in objectivity in dealing with tin alloys might have been avoided, to a degree, by the inclusion of a table (in the introductory chapter) listing the principal alloys of tin, their compositions, properties and chief uses. Readers should not expect to find information on the mining and refining of tin. The preface states that these subjects were excluded, but does not say why.

Very little "recent" information is worked into the individual chapters and very few 1957 and 1958 references are included in the chapter-end lists. Some of the information may soon become "out of date."

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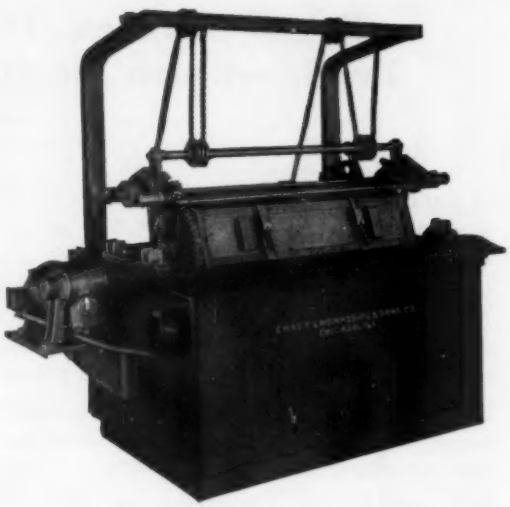

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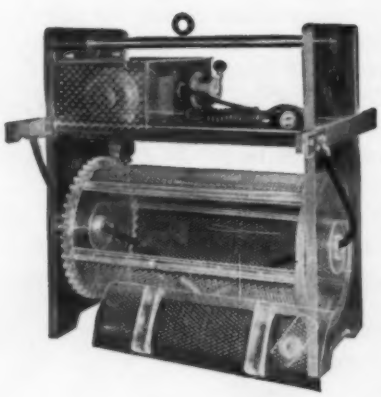

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FIRST WEST COAST AES NATIONAL CONVENTION PASSES IN REVIEW

AS A DRAMATIC and fitting climax of its 51st fiscal year, American Electroplaters' Society, Inc. (AES) conducted its outstanding 47th Annual Convention, first West of St. Louis, in Los Angeles, California, July 24-28, 1960, with the dynamic Los Angeles Branch, its West Coast pioneer, as Host Branch.

With Los Angeles's handsome Statler Hotel bulging with AES members and their families, and with many visitors and guests present from near and distant places, including many foreign countries, the Society's first West Coast National Convention earned wide attention in scientific and technical circles and in the press, and practically unanimous appraisal as one of AES's finest annual conclaves.

GOVERNOR AND MAYOR GREET AES

The AES was welcomed to California and Los Angeles by Governor Edmund G. Brown and by Mayor Norris Poulson. The entire week of the AES's Convention was, in fact, proclaimed by Los Angeles's Mayor as "American Electroplaters' Society Week in Los Angeles."

Result of four years of effective planning and effort by a large and well-departmentized Convention Committee of the AES's seasoned Los Angeles Branch, headed by General Convention Chairman Tony Stabile and Co-Chairman George J. Hetz, in tight coordination with AES National Officers and AES National Headquarters, the Los Angeles Convention marshaled one of the most thorough and versatile complements of Convention educational, fellowship and relaxational fare in the Society's eventful history. A West Coast atmosphere and spirit prevailed, and there was appropriately measured Convention pageantry and circumstance. The assembly also featured a memorable Ladies Program—abundant plant tours—many gifts and prizes.

NINE SESSIONS ENRICH KNOWLEDGE

Educational Sessions numbered nine. Experts presented 31 technical and scientific papers enriching knowledge in electroplating, metal finishing and allied arts. One Session alone covered organic finishing. High spots of the Sessions were not only the second annual "William Blum Lecture" that was delivered as the Educational Program's lead-off attraction by Dr. A. Kenneth Graham, 1959 winner of the "AES Scientific Achievement Award", the Society's highest scientific honor, but also the two-session, eight-paper "Hydrogen Embrittlement in Metal Finishing Symposium." In addition, this Convention, by the summary of AES Research Projects presented by AES Research Committee Chairman James D. Thomas at one of the Sessions, thereby launched a new Annual Convention tradition.

Under the active planning and supervision of the AES's Editorial Board itself, the Educational Sessions were programmed for the AES by Host Branch Educational Sessions Chairman Earl W. Arnold and his Co-Chairman, David F. Seymour, with Dr. Harold J. Read of Pennsylvania State University, a special member of that Los Angeles Branch Committee, responsible for the "Hydrogen Embrittlement in Metal Finishing Symposium."

STALWARTS WIN HIGH AES HONORS

Dr. Charles L. Faust was announced at the Grand Opening Session of AES's 47th Annual Convention as the 1960 winner of the "AES Scientific Achievement Award," the Society's summit scientific honor annually bestowed. And at the First Business Session of the Supreme Society, winning authors of outstanding papers published in PLATING MAGAZINE and in TECHNICAL PROCEEDINGS during the 1959-1960 AES fiscal year were presented with their earned awards.

In a dramatic moment at the Farewell Banquet, Past President Walter L. Pinner was announced as the very first winner of AES's annual "Charles Henry Proctor Memorial Leadership Award" donated by Mr. and Mrs. William Osborne Preston, son-in-law and daughter respectively of the late Charles H. Proctor, AES's founding father. From the hands of the National President himself, with the donors present, Mr. Pinner consequently received the $150 cash award plus the handsome Proctor Award scroll. He earned the Award by virtue of his leadership of the AES's Fifth International Conference on Electrodeposition and Metal Finishing conducted at the Society's GOLDEN JUBILEE CONVENTION in June 1959.

Bestowed for the first time, moreover, the envied "Order of Past Presidents Award" was presented in absentia at the Annual Meeting of the Supreme Society to Wright W. Wilson of Detroit, Michigan, General Chairman of the AES's renowned GOLDEN JUBILEE CONVENTION held in that Motor City, June 14-19, 1959.

WESLEY ASCENDS TO PRESIDENCY

AES's First Vice President, Dr. W. Andrew Wesley of Plainfield, New Jersey, was elected National President of the Society at the Second Business Session of the Supreme Society and was installed as AES's 46th National President midst honors. He succeeded Ralph D. Wysong of South Bend, Indiana, who continues on the Executive Board as Immediate Past President.

To the Third Vice Presidency, the AES's governing council elected Frank O. Beuckman of Rochester, N. Y. And to AES's other Vice Presidencies, the Supreme Society up-

LIEUTENANT GOVERNOR ARRIVES TO LAUNCH CONVENTION

(Left to Right) Robert L. Giesel, president, National Association of Metal Finishers; John P. Nichols, National Executive Secretary, American Electroplaters' Society; Ralph D. Wysong, National President, American Electroplaters' Society; Stephen D. Gavin, Deputy Mayor of Los Angeles; Glenn M. Anderson, Lieutenant Governor of California; Paul F. Glaser, Convention Keynote Speaker; Raymond F. Ledford, president, Metal Finishing Suppliers' Association.

RANDOM VIEWS AT AES'S LOS ANGELES CONVENTION

(1 & 2) Registration in full operation early Sunday afternoon. (3) Convention General Chairman Tony Stabile, right, pins badge on the 1000th registrant. Total registration about 1250. (4) Bus load of platers on the way to plant visit. (5) Youngsters and oldsters alike enjoyed the Statler Swimming Pool. (6) The Ladies Committee in colorful Squaw costumes. (7) Speakers' Breakfast. Earl W. Arnold, Educational Chairman at head of table. (8) Manning the PLATING MAGAZINE table, S. W. Freestone, advertising manager, and Kathryn H. Langan, accountant. (9) The Cocktail Party given by the MFSA just before the AES Annual Banquet.

graded Chester G. Borlet and Manuel Ben respectively. It also elevated Past National Presidents Frederick Fulforth and Walter L. Pinner to coveted Honorary Membership of the Society. Awards of Merit, moreover, were voted by the Executive Board to Howard J. McAleer of Detroit and to Past National President Herberth E. Head.

LEADERSHIP THAT FASHIONED CONVENTION

Aside from the already named leaders of the AES's 47th Annual Convention, Convention Chairman Stabile's functional Subchairmen included Mrs. Glenwood J. Beckwith (Ladies), Walter P. Behlendorf (Finance), Lawrence M. Henderson (Hotel), John D. Millhorn (Program), C. Phillip Simon (Registration), L. Truman Stoner (Outing), Norman F. Painter (Housing), William P. Thomas (Banquet), E. W. Wells (Publicity), Laurence A. O'Neil (Entertainment), Harvey K. Hunt (Plant Visits), Eugene Bosl (Children) and G. Stuart Krentel (Printing).

The day-to-day log of AES's 47th Annual Convention follows:

SUNDAY, JULY 24

The Executive Board met in full day's meeting and overcame a substantial agenda. That same afternoon, the Credentials Committee under Past National President Arthur W. Logozzo completed its business and its final report. The Honorary Membership Awards Committee and the Scientific Achievement Award Committee also met.

An impressive brunch honoring the six National Officers' wives was given in the forenoon by the Ladies Committee headed by Mrs. Glenwood J. Beckwith, and a large "Western Welcome Tea" was conducted for an even larger AES assembly by the Ladies that same afternoon.

Convention registration also made a good start that Sunday. And that evening, in the Statler's beautiful Golden State Room, a large AES audience attended and enjoyed the 47th Annual Convention's "Get-Together Party."

MONDAY, JULY 25

The Statler's Golden State Room was locale of the Grand Opening Session that auspiciously launched the Society's 47th Annual Convention. A two-tier dais fronted that handsome assembly hall, and dais backdrop was the AES's ceremonial banner.

The big room was filled to capacity by 10 o'clock when dais occupants filed in from an adjoining room. Among them were all of AES's National Officers, the President of the Los Angeles Branch and the heads of the Convention. Also among them were some 17 AES Past National Presidents. And among them was Lieutenant Governor Glenn M. Anderson representing Governor Edmund G. Brown, and Deputy Mayor Stephen D. Gavin representing Mayor Norris Poulson.

Following the rendering of the National Anthems and the delivery of the invocation by the Rev. Father John Healy, the AES was formally welcomed to Los Angeles by Deputy Mayor Gavin officially representing Mayor Poulson who was unable, at the last moment, to be present. Presented next by Convention Co-Chairman George J. Hetz who served as Master of Ceremonies, National President Ralph D. Wysong responded in behalf of the Society.

The assembly next heard the Memorial Roll read by National Executive Secretary John P. Nichols, then stood in reverent moment of silence as a tribute to the memory not only of the deceased who founded and developed AES through the five decades of its lifetime, but also of those who demised during the Society's 1959-1960 fiscal year.

MISSILE EXPERT AS PRINCIPAL SPEAKER

Lieutenant Governor Anderson next extended California's greetings to the Society, and the assembly also heard brief welcoming talks by Los Angeles Branch President Frank Virgil and by Ladies Chairman Dolly Beckwith. The principal address was delivered by Paul F. Glaser of the Space Technology Laboratories of El Segundo, California, Project Engineer for "Pioneer V," the solar satellite, and for "Explorer VI," the "Paddlewheel" satellite. Dr. Charles L. Faust was next announced as 1960 winner of the annual "AES Scientific Achievement Award", the Society's highest scientific honor. The announcement was made by Chairman Henry B. Linford of that Award's Selection Committee.

OPENING SESSION OF AES'S FIRST WEST COAST NATIONAL CONVENTION

(1) AES President Ralph D. Wysong responds to Governor's Welcome. (2) Occupants of the double-tiered dais standing in background. (3) Convention Co-Chairman George J. Hetz extends greetings of the Host Branch. (4) Los Angeles Deputy Mayor Gavin welcomes Conventioneers to the Convention City. (5) Lieutenant Governor Anderson speaks in behalf of the Governor of California. (6) Keynote Speaker Glaser told about probing outer space. (7) Dr. Henry B. Linford announcing the 1960 winner of the AES Scientific Achievement Award. (8) A surprised Dr. Charles L. Faust responds to announcement that he won 1960 AES Scientific Achievement Award. (9) AES Supreme Society in first business session of the Convention.

The Grand Opening Session terminated with the traditional ceremony during which General Convention Co-Chairman Hetz, in behalf of General Chairman Stabile, delivered the Society's golden gavel to National President Wysong thereby symbolically turning the Convention over to the Society's National President.

GOVERNING COUNCIL'S FIRST SESSION

The First Business Session of the Supreme Society, AES's summit governing council, was held immediately after the Grand Opening Session in the same assembly room, with National President Wysong himself presiding. And as first orders of business, that Supreme Society meeting approved the report of the Credentials Committee presented by Committee Chairman Arthur W. Logozzo, then enacted a memorial resolution recording its grief over the recent passing of August Peter Munning, both an industrialist and Executive Secretary of the Metal Finishing Suppliers' Association.

Besides receiving the reports of the six National Officers and of the Society's Standing and Special Committees; besides hearing of the permanent chartering of the Memphis-Midsouth Branch as the AES's 59th Branch; besides preliminarily considering the 1959-1960 Financial Statement and the proposed 1960-1961 AES/PLATING MAGAZINE general operating budget, the Society's governing council also heard the report of the 1959-1960 Paper Awards Committee headed by Chairman William M. Tucker and composed of Dr. Henry Brown and Clarence H. Sample. Con-

OPENING EDUCATIONAL SESSION HEARS 1960 "WILLIAM BLUM LECTURE"

(1) Dr. William Blum introducing Dr. A. Kenneth Graham, deliverer of the 1960 "William Blum Lecture." (2) Attentive audience hears Dr. Graham (3) Dr. Graham holds scroll presented by National President Ralph D. Wysong.

DISTINGUISHED AES PUBLISHED PAPERS RECOGNIZED AND REWARDED

(1) A. W. Wallbank traveled from England to accept in person the Heussner AES Gold Medal Award. (2) William J. Cotton receives Bronze Medal Award. (3) Hogaboom Memorial Nickel Plating Award went to Mitchell G. Osman. (4) Dr. George Dubpernell won the Chromium Plating Award. (5) Frank D. Foley accepts Hanney Memorial Copper Plating Award. All presentations were made by National President Wysong.

sequently, the following awards were then made to the following:

THE CARL E. HEUSSNER AES GOLD MEDAL AWARD

Co-Sponsored by AES and the United Platers' Foundation (Glenn H. Friedt, Trustee) for the best paper published in AES publications during the 1959-1960 fiscal year, presented to "Barrel Plating with Special Consideration to Protection of Thread Diameters" by A. W. Wallbank, Ionic Plating Company, Ltd., Birmingham, England. (TECHNICAL PROCEEDINGS, 1959 Edition)

THE AES SILVER MEDAL AWARD

Sponsored by AES for the second best published paper, presented to "Chemical Polishing of Copper and its Alloys" by Dr. Heinz Spahn, Laboratorium fuer Physikalishe Chemie und Elektrochemie, Technische Hochschule Stuttgart. (TECHNICAL PROCEEDINGS 1950, Editon)

THE AES BRONZE MEDAL AWARD

Sponsored by AES for the third best paper published during the fiscal year, presented to "Hydrogen Embrittlement of High-Strength Steels During Cadmium, Chromium and Electroless Nickel Plating" by William L. Cotton, Boeing Airplane Company. (PLATING MAGAZINE, February 1960)

THE GEORGE B. HOGABOOM MEMORIAL NICKEL PLATING AWARD

Co-sponsored by AES and its Hartford Branch, presented to "The Automatic Additions of All Chemicals to the Nickel Plating Bath" by Mitchell G. Osman, Radio Corporation of America. (PLATING MAGAZINE, July 1959)

THE CHROMIUM PLATING AWARD

Co-sponsored by AES and the Nutmeg Chrome Corporation, presented to "The Development of Chromium Plating" by George Dubpernell, Metal & Thermit Corporation. (PLATING MAGAZINE, January 1960)

THE ROBERT S. LEATHER MECHANICAL FINISHING AWARD

Co-Sponsored by the AES and the Lea Manufacturing Company, presented to "The Nature of Mechanically Polished Surfaces" by L. E. Samuels, Department of Supply, Defence Standards Laboratories, Australia. (TECHNICAL PROCEEDINGS, 1959 Edition)

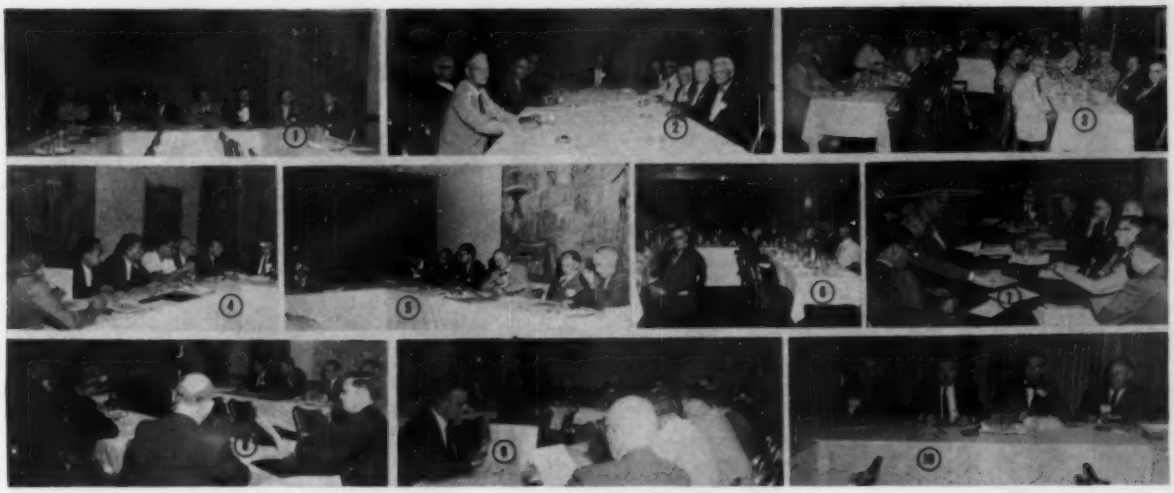
THE JOHN J. HANNEY MEMORIAL COPPER PLATING AWARD

Co-sponsored by AES, its Grand Rapids Branch and the Metal & Thermit Corporation, presented to "Copper Electroforming of Heat Sinks for Missile Nose Cones" by Frank D. Foley, Avco Corporation. (PLATING MAGAZINE, November 1959)

The Paper Awards Committee made no 1959-1960 selections for the "Precious Metals Plating Award of AES" sponsored by International Nickel Company due to less than the required number of papers available for selection. Two such available papers were referred by that Committee to its successor for 1960-1961 Award consideration.

REPLACEMENTS FOR AES's BUSY COMMITTEES

In behalf of the Executive Board, National Executive Secretary Nichols next announced appointment by that Board of the following to these AES Standing Committees for respective three-year terms effective July 25, 1960.



SOCIETY'S BOARDS AND COMMITTEES IN BUSY MEETINGS

(1) Public Relations Committee. (2) Order of Past Presidents Business Meeting. (3) Branch Secretaries Luncheon. (4 & 5) Editorial Board Meeting. (6) Librarians and Educational Committee Luncheon. (7) Publications Committee Meeting. (8 & 9) Research Committee Meeting. (10) Educational Committee Meeting.

EDITORIAL BOARD:

Dr. Henry Brown (The Udylite Corp.); Edward E. Oberland (Western Electric Co.) and Gerald H. Lux (The Oakite Products, Inc.). Also Joseph J. Marotta, Western Electric Company (1 year)

EDUCATIONAL COMMITTEE:

Ezra A. Blount (Products Finishing Magazine); Edward C. Bertucio (International Nickel Co.) and Dr. Nelson F. Murphy (Virginia Polytechnic Institute).

HONORARY MEMBERSHIP AWARD COMMITTEE:

Herberth E. Head (Chrysler Corp.) and Arthur G. Pierdon (Art Metal Finishing Co.) 2 year terms

MEMBERSHIP COMMITTEE:

James E. Cogan (Globe Electro Plating Co.); L. Truman Stoner (Chief Products Co.) and Robert D. Martin (Ramo-Woolridge Co.). Also Bruce Leslie (Consultant for Australia) and S. A. Frost (Consultant for Canada)

PUBLICATIONS COMMITTEE:

Dr. Abraham M. Max (Radio Corporation of America); Dr. Roy C. Spooner (Aluminum Laboratories, Ltd. Canada); James D. Thomas (General Motors Corporation).

PUBLIC RELATIONS COMMITTEE:

Harold J. McCracken (Northwest Chemical Co.); G. Ross Davidson (Canadian Hanson & Van Winkle Co. Ltd.) and Allen Ferguson (MacDermid, Inc.)

RESEARCH COMMITTEE:

Dr. B. B. Knapp (International Nickel Co.); Irvin M. Weiss (Metal & Thermit Corp.) and Whitney Snyder (American Motors Co.)

SCIENTIFIC ACHIEVEMENT AWARD COMMITTEE:

Dr. William Blum (Consultant) and William M. Tucker (Eastman Kodak Co.)

While the youth of AES journeyed for an all-day supervised tour of motion picture studios, Farmers' Market and other Los Angeles attractions, three luncheons occupied adults this Monday noon period, namely, 1) The Ladies' repast and entertainment in the Statler's Pacific Room, 2) The Speakers' Luncheon, and 3) the traditional Branch Secretaries' Luncheon held in the New York Room with National Executive Secretary Nichols presiding.

GRAHAM DELIVERS "BLUM LECTURE"

In the appropriately dressed Golden State Room of the Statler Hotel before a capacity audience, the Opening Educational Session took place at 2:00 P.M. Host Branch Educational Sessions Chairman Earl W. Arnold introduced the eminent Dr. William Blum, who then presided for the balance of that impressive session.

The second "William Blum Lecture" was next delivered by Dr. A. Kenneth Graham, 1959 winner of the "AES Scientific Achievement Award," on the subject of "Faraday's Laws Applied to Cleaning." His paper earned wide favorable audience comment. At its conclusion, he was presented with the laminated scroll of the AES Scientific Achievement Award, plus a $500.00 attendant honorarium by National President Wysong in behalf of the American Electroplaters' Society, Inc.

EDITORIAL BOARD SPEEDS 1961 PROGRAM

While large audiences attended that afternoon's dual Educational Sessions (A and B) that followed the Opening Education Session, and while others toured the plant of the United States Chem-Milling Corporation at Manhattan Beach, the Editorial Board was meantime in session in the Boston Room with Chairman John P. Nichols presiding.

The Editorial Board complimented its retiring members, namely, Dr. Abraham M. Max, Donald C. Austin and G. Ross Davidson, for worthy service during their respective three-year terms, then welcomed its new members. It extended Board commendation to Branch Educational Chairman Earl W. Arnold, to his Co-Chairman David F. Seymour, and to Dr. Harold J. Reed, for high grade performance in the development of the Los Angeles Convention's Educational Program. It next finalized work remaining on that program, then commenced its arduous work on the 1961 Boston Convention's Educational Sessions with George J. Marotta, the Boston Branch's Host Educational Sessions Chairman present and prominent in the discussion and planning.

CONVENTION BALL SWEETENS DAY

That same afternoon the Midwest Regional Council, under the leadership of Chairman Leslie L. Diveley, and the

OFF-DUTY PLAY IN CALIFORNIA'S RENOWNED DISNEYLAND

(1) Platers arriving at the Disneyland gate. (2) The Sleeping Beauty Castle, entrance to Fantasyland where storybook tales come to life. (3) The Matterhorn with its thrilling ride. (4) Old style double-decker buses carried platers and their families around the fascinating streets of Disneyland. (5) Full-blooded Indians manned the canoes. (6) Mrs. and Mr. John Lockerbie pause for a moment's rest.

Order of Past Presidents, under Chairman Samuel Heiman, conducted business meetings. The Order thereafter held its annual dinner meeting. At the business meeting of the Order, in fact, Past President Samuel S. Johnson was elected its 1960-1961 Chairman, and Past President Herberth E. Head was named its Secretary-Treasurer.

That eventful Monday concluded with the gala Convention Ball given by the Metal Finishing Suppliers' Association (MFSA) that earlier that day had elected as its 1960-1961 President, Frederick P. Green of the Crown Rheostat & Supply Company succeeding Raymond F. Ledford, President of the Chemray Corporation. It became known during the Convention, furthermore, that the National Association of Metal Finishers had elected Robert L. Giesel of Chicago as its President for 1960-1961.

TUESDAY, JULY 26

The "Charles Henry Proctor Memorial Leadership Award" Selection Committee Breakfast and the Speakers' Breakfast led off this day's morning events, together with the golf tournament sponsored by the MFSA held at Los Coyotes Country Club in Buena Park.

And while Educational Sessions C and D were respectively being held in the Golden State and the West Garden Rooms later that forenoon, the Membership Committee and the Public Relations Committee were each convened in executive sessions elsewhere.

Another important meeting conducted this forenoon was the organization meeting of the Southwestern Regional Council, with Chairman Protem Myron E. Browning Jr. presiding. At that meeting, the proposed Council informally came into being composed tentatively of AES's Dallas-Fort Worth, Kansas City, Wichita, Houston, Denver and Phoenix Branches.

AES members and their ladies, children and guests then converged that afternoon upon Disneyland, and fashioned memories there to last each a lifetime.

WEDNESDAY, JULY 27

Members of the Research Committee, District Supervisors, Past Research Committee Chairmen, Regional Research Finance Chairmen and other key AES Research Program personnel, together with AES's six National Officers, attended the traditional Research Program Breakfast held in the Statler's Cleveland Room early this forenoon. Elsewhere, the day's Speakers were guests of the Convention at breakfast. Meantime, the youth of AES boarded early morning special buses for their all-day supervised visit to Marineland of the Pacific and to Knott's Berry Farm.

1960-1961 RESEARCH PROGRAM FIRMED

The Research Committee Annual Meeting immediately followed its traditional annual breakfast. After welcoming its new members, the Committee proceeded to adopt the Research Program's general operating budget for 1960-1961, later ratified by the Executive Board. Five active Research Projects were continued for 1960-1961; two were concluded and were replaced by two new projects.

The Research Committee elected Dr. D. G. Foulke of the Sel-Rex Corporation as 1960-1961 Research Chairman succeeding James D. Thomas, General Motors Corporation, Detroit. Aside from conducting other business important to the AES Research Program, the Committee also elected Raymond L. Mitchell, Mitchell-Bate Corp., as Vice Chairman for Finance and Dr. Harold J. Wiesner of Bendix Aviation Corporation as Vice Chairman for Research for 1960-1961. It warmly commended its retiring members, namely, James D. Thomas, Kergan Wells and Glade B. Bowman, for creditable three-year service to AES Research.

PUBLICATIONS COMMITTEE DISCUSSES SYMPOSIA

At the meeting of the Publications Committee held that same forenoon, meanwhile, the Committee expressed pleas-

SOCIETY'S REGIONAL GROUPS AT WORK AT AES'S 47TH ANNUAL CONVENTION

(1 & 2) Midwest Regional Council meeting was chairmanned by Leslie L. Diveley, at head of table in picture 2. (3) Regional Councils and Regional Groups Meeting. (4) Formation Meeting of the Southwestern Regional Council.

ure over the progress made in 1959-1960 by the AES's broadened book publishing program.

It heard a report concerning the "Finishing of Light Metals Symposium" that will be held at the AES Boston Convention in June 1961. The Committee, explored a number of other technical subjects, moreover, of wide membership interest.

EDUCATIONAL COMMITTEE HEARS NORTON

The Educational Committee meantime met in the Washington Room. Having welcomed its new members, the Committee then plunged deeply into consideration of the 1961 Speakers' List and other elements of its 1960-1961 Program. It then joined with Branch Librarians to conduct its traditional Convention luncheon meeting, with AES First Vice President W. Andrew Wesley in the role of Chairman of that joint meeting.

At that luncheon, Robert M. Norton, Chairman of AES's Public Relations Committee, reviewed the AES statement of policy with respect to Branch educational meetings that had been formulated by that Committee, then ratified by the Executive Board. Large interest marked the discussion.

HYDROGEN EMBRITTLEMENT SYMPOSIUM STARS

And in the Golden State Room starting at 9:00 a.m. this day, the Society launched its first large scale symposium. Treating the theme "Hydrogen Embrittlement in Metal Finishing," four experts presented papers at that forenoon symposium session (Session E) with Dr. Harold J. Read in the chair.

The large audience was reminded by Dr. Reed that each of the eight papers featuring that day's two-session symposium, together with the discussion attending the delivery of each such paper, would not only be published in the AES's copyrighted book, "TECHNICAL PROCEEDINGS" (1960 Edition), but also in a special book to be thereafter published by the Rheinhold Publishing Company for world sale by contract with AES.

The speakers' Luncheon was meantime held in the New York Room. And, at the Sportsmens' Lodge in North Hollywood the AES ladies and their guests enjoyed a gala luncheon seasoned by a California-type fashion show.

The continuation of the "Hydrogen Embrittlement in Metal Finishing Symposium" occurred after luncheon (Session F) and presented four outstanding papers by prominent experts on that subject.

FLOOR SHOW THRILLS AUDIENCE

Later that afternoon, the respective representatives of AES's Regional Councils and Regional Groups met together in the Dallas Room for exchange of views and ideas of mutual interest, with National Executive Secretary Nichols presiding. Regions and Groups represented included the Dixie Group; Empire State Group; Midwest Council; New England Group; and the neophyte Southwestern Group.

That same evening, the "Hydrogen Embrittlement in Metal Finishing Symposium" concluded with a well-attended open forum on that subject, with Dr. Harold J. Read in the role of Moderator. The forum was followed by a widely anticipated floor show and dance that filled the sizable Pacific and Sierra Rooms of the Statler to capacity, and which drew accolades by its excellence.

THURSDAY, JULY 28

As speakers of the day breakfasted in the St. Louis Room, the youth of AES made an early start for their day-long excursion by boat around scenic Los Angeles and its waterways.

Non-Delegates either attended one or the other of this forenoon's Educational Sessions (G and H) or joined the large group that visited the McCulloch Corporation's large plant in Los Angeles.

The ladies of the Society, meanwhile, visited a motion picture studio and witnessed a production in process, then journeyed to famed Farmer's Market for luncheon and an afternoon of shopping or other Los Angeles capers.

While their ladies thus spent this afternoon, male AES members were either being educationally enriched at the closing Educational Session (I) or were participating in the tour of the plant of Golden Citrus Juices, Inc. in nearby Anaheim. For the governors of the AES, however, this was an all-day, busy legislative day. With a record number

PAST PRESIDENTS JOIN FOR ANNUAL FAMILY BANQUET

National Officers and their wives were also in attendance.

FOUR BRANCHES RECOGNIZED FOR NOTEWORTHY MEMBERSHIP EXPANSION

(1) National Second Vice President Chester G. Borlet presents Division A Membership Award to Earl Coffin, Los Angeles Branch. (2) James Weaver receives Division C Award for Phoenix Branch. (3) John Cippolla, president of Rochester Branch and (4) H. R. Smallman of San Francisco receive like Awards when their Branches tied for first place in Division B.

of accredited Delegates and Alternate Delegates present, the Supreme Society's Annual Meeting commenced at 9:00 a.m. in the Sierra Room and continued through the day, with National President Wysong in the chair.

GOVERNORS IN RESULTFUL ASSEMBLY

The Society's governing council's legislative actions and enactments of that Annual Meeting included the following:

1. Following detailed consideration, the financial statement of the Society and its PLATING MAGAZINE, for the fiscal year spanning July 1, 1959 through June 30, 1960, was duly approved.

2. The governing council also approved the 1960-1961 General Operating Budget of the Society and its PLATING MAGAZINE covering the fiscal year from July 1, 1960 through June 30, 1961 as submitted by the Executive Board. It embodies a budget of AES/PLATING operating expenses aggregating $257,125 for the fiscal year from July 1, 1960 through June 30, 1961 compared with the 1959-1960 operating budget that totalled $256,025 for the twelve-month fiscal period, July 1, 1959-June 30, 1960.

3. The Supreme Society received the report of the Executive Board as to the status and performance of AES investments in the 1959-1960 fiscal year. It concurred with the Board's judgment in continuing those investments during the fiscal year as constituted. It approved the report as received from the Board through Vice President W. Andrew Wesley.

4. The Los Angeles Branch was announced as winner of the Branch Membership Expansion Competition for 1959-1960 in its class (Division A), and that Branch was awarded the $50 annual prize from AES for that achievement. The San Francisco and Rochester Branches tied for first place in Division B and therefore shared that Division's annual $50 cash award. The Phoenix Branch prevailed in Division C, and received the annual $50 AES Award for that Division.

5. The Supreme Society, at that same Los Angeles Annual Meeting, elevated Past National President Frederick Fulforth and Past National President

STALWARTS UPGRADED TO HONORARY MEMBERSHIP OR CITED BY BOARD

(1) Past National President Herberth E. Head receives Award of Merit from newly elected President W. Andrew Wesley. (2) National President Wysong bestows Honorary Membership on Past National President Frederick Fulforth and (3) on Past National President Walter L. Pinner.

ANNUAL MEETING OF AES'S SUMMIT GOVERNING COUNCIL

(1) Dais at July 28 business meeting. L to r, Manuel Ben, Third Vice President; Chester G. Borlet, Second Vice President; Ralph D. Wysong, President; John P. Nichols, National Executive Secretary; Dr. W. Andrew Wesley, First Vice President; Herberth E. Head, Past President. (2) Installation of newly elected 1960-61 National Officers, Herberth E. Head, who performed the installation, pins Third Vice President Frank O. Beuckman. L to r, President W. Andrew Wesley, First Vice President Chester G. Borlet; Second Vice President Manuel Ben, Mr. Head, Mr. Beuckman, Past President Ralph D. Wysong. (3) Newly elected National President W. Andrew Wesley, center, congratulated by Herberth E. Head. Ralph D. Wysong at left. (4) Herberth E. Head takes seat as Delegate of Detroit Branch after completion of five years on the Executive Board as National Officer. (5) Tally of the vote for Third Vice President. (6) Retiring President Wysong presents gavel to incoming President Wesley. (7) Newly elected Frank O. Beuckman expresses appreciation for the confidence placed in him by the Delegates. (8) The Supreme Society in session with President Wesley presiding.

Walter L. Pinner to the coveted ranks of AES Honorary Membership. With these additions, that select circle now numbers fourteen such members living.

6. The Executive Board also announced its granting of Awards of Merit to Past National President Herberth E. Head for a distinguished record made in the conduct of AES Industrial Finishing Expositions since their very start, and to Fifth Industrial Finishing Exposition Chairman Howard J. McAleer for the outstanding success, during the AES's GOLDEN JUBILEE, of that particular 1959 Exposition.

7. The Supreme Society also enacted and promulgated a resolution offered by the Syracuse Branch commending Daniel Gray of that Branch for long-time AES service and wishing him early recovery to good health.

8. It heard and commended the report of Los Angeles Convention Committee, and also heard reports as to AES's future Conventions from Convention Chairman Louis V. Gagnon (Boston 1961); Convention Chairman Herman A. Tessman (Milwaukee 1962); Convention Chairman D. Foulke (Atlantic City 1963); Convention Chairman A. P. Julius (St. Louis 1964) and Convention Chairman Milton Nadel (New York 1965). It also heard the report as to the Society's coming Eighth Interim Meeting (Hartford, Connecticut, February 11, 1961) by Co-Chairman Richard C. Barrett of the Bridgeport Branch.

9. It witnessed the bestowal by the National President, in behalf of the Order of Past Presidents, of that Order's first Award for exceptional service to AES. That Award went to Wright W. Wilson of Detroit, Michigan.

10. From among documented Branch invitations for selection as Host Branch of the Society's 53rd Annual Convention to be held in 1966, the Supreme Society voted that honor to the Dixie Regional Council. That AES area group prevailed over the Buffalo Branch in the poll of Branches composing the Supreme Society. Consequently, the 1966 AES National Convention will be held in Miami Beach under the aegis of the Dixie Regional Council, with the Southeastern Branch as host.

11. Upon recommendation of the AES Executive Board, also supported, by the way, by the Board of Trustees of the Metal Finishing Suppliers' Association (MFSA), the Supreme Society voted St. Louis as site of the AES's Sixth Industrial Finishing Exposition to be held there during the three-day period, June 16-18, 1964, and to be conducted under the Executive Board. Concurrently, the AES's 51st Annual Convention will be held in that same community during the period June 15-18, 1964 with the Society's St. Louis Branch as Host Branch.

12. As Host Branch of the Society's Ninth Interim Meeting (1962), the governing council tapped the Indianapolis Branch.

LOS ANGELES-GRADE FELLOWSHIP AND PLAY OCCUPY AES'S LADIES

(1 & 2) Los Angeles Branch Ladies honor the National Officers' wives at Sunday morning brunch. In picture 2 Mrs. Glen J. Beckwith, Ladies Chairman, welcomes the guests to Los Angeles. (3, 4 & 5) Ladies' luncheon on Monday in the Pacific Room of the Hotel Statler. (6) The ladies leave by bus for the Sportsmen's Lodge, North Hollywood. (7 & 8) Ladies at lunch at the Sportsmen's Lodge. (9, 10 & 11) Models display latest fashions at the show which followed the luncheon. (12) Boarding the bus for return trip after the luncheon and fashion show.

13. The Supreme Society enacted a resolution making it recorded AES policy that the Interim Meeting be held annually on the second Saturday after the first Sunday in January, effective in 1962. It also ordered that Branches hosting its Annual Interim Meetings be instructed to hold no competing scheduled activity during the business session of the Interim Meeting.

14. Through a resolution prepared by Chairman Manson Glover of the Law Committee, the Supreme Society enthusiastically expressed congratulations and commendation to the Los Angeles Branch, and to its entire Convention Committee, for a unique 47th Annual Convention, first west of St. Louis in AES's fifty-one year history.

NATIONAL OFFICERS ELECTED FOR 1960-1961

Dr. W. Andrew Wesley, International Nickel Company, Bayonne, N. J. was elected AES National President for 1960-1961 succeeding Ralph D. Wysong, Studebaker-Packard Corporation, South Bend, Indiana, who, as Immediate Past President, will serve on the 1960-1961 Executive Board.

The Supreme Society also elected Chester G. Borlet, Grand Rapids Brass Company, Grand Rapids, Michigan, as First Vice President; Manuel Ben, General Motors Corporation, Detroit, Michigan, as Second Vice President and Frank O. Beuckman, Eastman Kodak Company, Rochester, N. Y. as Third Vice President.

The elected 1960-1961 National Officers were installed by Past President Herberth E. Head. In retiring from Executive Board membership after five years of outstanding AES service, including tenure as National President during the AES's FIFTIETH ANNIVERSARY in 1959, Mr. Head, was given a standing ovation as he took his place in the Detroit Branch delegation as an accredited Delegate of that Branch.

President Wesley, upon receiving his silver-plated gavel emblematic of highest AES office at the hands of his successor, then presented Immediate Past President Wysong with his Past National President's pin and with a plaque symbolizing the Society's appreciation to him for an effective term as AES's titular head.

FAREWELL BANQUET DRAWS CAPACITY

Gaily bedecked, the spacious Pacific and Sierra Ballrooms of the Statler Hotel had been transformed into a brilliant banquet hall so as to set proper scene for the Society's capacity-packed memorable Farewell Banquet that Thursday evening. A splendid cocktail party, given by the MFSA, preceded the Banquet.

The rendering of the National Anthems of the United States and of Great Britain (out of respect for the Society's Canadian and Australian Branches) immediately followed the entrance of the National and Branch Officers and distinguished guests of the Society gracing the head table.

After dinner had been served, General Convention Chairman Tony Stabile, as Master of Ceremonies, introduced the dais thus starting the evening's program. He then called upon Immediate Past President Ralph D. Wysong for a

GALA FAREWELL BANQUET TERMINATES AES'S MEMORABLE WEST COAST ANNUAL CONVENTION

(1) Dais occupants applauded as they take their places. (2) Walter L. Pinner receives first Charles Henry Proctor Award. Standing, l to r, Immediate Past President Ralph D. Wysong; Walter L. Pinner; National Executive Secretary, John P. Nichols; President W. Andrew Wesley. Seated, Mrs. Tony Stabile. (3) Standing for the playing of the National Anthems at beginning of the Annual Banquet. (4) Dais at the Annual Banquet. L to r, NAMF President and Mrs. Robert L. Giesel; Los Angeles Branch President and Mrs. Frank Virgil; 1958-59 National President Herberth E. Head; Mrs. Florence Marquardt; National Executive Secretary and Mrs. John P. Nichols; Immediate Past President and Mrs. Ralph D. Wysong; Convention Chairman and Mrs. Tony Stabile; Mrs. Wesley hidden by flowers, President W. Andrew Wesley; Mrs. and First Vice President Chester G. Borlet; Mrs. and Second Vice President Manuel Ben; Mrs. and Third Vice President Frank O. Beuckman; Mrs. and MFSA President Fred P. Green; Convention Co-Chairman George J. Hetz.

brief message as the AES's elected head during 1959-1960. National President W. Andrew Wesley next delivered his banquet address as the Society's titular head. Then came an awaited moment, namely the announcement of the very first winner of the Society's highest administrative honor, its first annual "Charles Henry Proctor Memorial Leadership Award."

As Chairman of the Selection Committee, Immediate Past President Wysong announced that the first bestowal of that highest annual non-scientific, non-technical award was overwhelmingly voted by the Committee to Past President and AES Honorary Member Walter L. Pinner of Detroit for his leadership in the planning, programming and conducting of the Fifth International Conference on Electrodeposition and Metal Finishing staged by the AES concurrently with its GOLDEN JUBILEE Convention and Fifth Industrial Finishing Exposition in Detroit, June 15-19, 1959.

With the donors present, namely Mr. and Mrs. William Osborne Preston, son-in-law and daughter respectively of the late Charles Henry Proctor, founder of the Society, President Wesley delivered the $150 cash award and the handsome scroll of that high honor to Mr. Pinner. The announcement of Mr. Pinner's victory, the delivery of the award to him and his acceptance thereof were each greeted by the large audience with thunderous applause.

After the closing of that impressive program thereby formally ending the Farewell Banquet, the assembly danced to the late hours.

FRIDAY, JULY 29

The new President's traditional breakfast for National Officers and their wives was held early this forenoon, followed by a full morning's busy meeting of the Executive Board. During it, the 1960-1961 Law Committee Chairman was announced by President Wesley, namely Manson Glover of Boston. And as Branch representatives on the 1960-1961 "Charles Henry Proctor Memorial Leadership Award Selection Committee," the Board appointed the Presidents of the AES's Syracuse and Kansas City Branches.

CONVENTION STATISTICS EXCEED EXPECTATION

General Convention Chairman Stabile's report to the Board announced Convention's registration attendance at about 1250 (including children) subject to slight possible change at final audit.

Four years in planning and staging, the superb 47th Annual Convention, first AES annual conclave ever held west of St. Louis, earned a proud niche in the pantheon of AES National Conventions by its general excellence. With its close, the entire Society cast its eyes upon the 1960-1961 fiscal year, AES's fifty-second year of life, anticipating a banner 1960-1961 educational season to be climaxed by the 48th Annual Convention—this one to be held in historic Boston, June 18-23, 1961, hosted by the Boston Branch observing its own Fortieth Anniversary.

THE SOCIETY'S 1960-1961 EXECUTIVE BOARD AND NATIONAL OFFICERS

Left to right, Manuel Ben, Second Vice President; Chester G. Borlet, First Vice President; Dr. W. Andrew Wesley, President; John P. Nichols, National Executive Secretary; Frank O. Beuckman, Third Vice President; Ralph D. Wysong, Past President.

AES LADIES AND THE CITY OF ANGELS

by
Frances M. Hoffman
(Mrs. August R. Hoffman, Cleveland, Ohio)

Greetings to everyone, everywhere! The ladies witnessed the best Convention in 1960. We are sorry if you missed it! If you were one of the lucky ladies, let's tell everyone about our exciting activities.

The Los Angeles ladies did a beautiful job. All of us who were in attendance were fully aware of the tremendous amount of work which had to be done by the various Committees to launch a successful Ladies Program. The activities took place within one short week, but we know the many, many months of actual planning and much hard work that took place before greeting us from "Everywhere."

It was a "First" in some of our activities as well as our "First" in the Far West. Mrs. Dolly Beckwith, our gracious Chairman of the Ladies Program and her Co-Chairman, Mrs. Norman Painter, launched the Convention activities with a "First Brunch" to honor the wives of the National Officers. This was a delightful get-acquainted event. Ten states were represented and twenty-eight ladies chatted about their activities.

The Sunday afternoon "Ladies Tea" was a lovely activity with delicious refreshments and plenty of laughter and enthusiastic buzzing. This was another "First" because the husbands were invited to escort the ladies. We were really amused as well as delighted to see so many "fancy husbands" attending the "fancy afternoon tea." Mrs. Beckwith and her Committee radiated a feeling of friendliness and hospitality which gave all of us a feeling of "belonging." Thanks to the American Buff Company for sponsoring this lovely Tea.

The traditional Sunday night "Get-Together Party" was a huge success. It was a perfect setting to renew old acquaintances and make new friends.

The Grand Opening Session on Monday morning set the stage for a perfect start for a week of education and excitement. The ladies have adopted the morning session as well as the men, for they now realize they miss the first educational spirit of the Convention if they fail to attend. After Rev. Father Healy pronounced the invocation, Mr. Frank Virgil, President of the Host Branch, greeted Delegates, members and ladies. Mrs. Glen Beckwith welcomed the ladies. The platers were officially welcomed by Deputy Mayor S. D. Gavin as well as by California's Lieut. Governor L. M. Anderson. Keynote speaker was Paul Glaser, who took us far into space.

Although we went into outer space, the ladies came down quickly to attend a delightful luncheon and entertainment on Monday noon in the Golden State Room. This was truly a delightful affair as Mr. and Mrs. Art Breyfogle presented a Travel-Skit, sponsored by KLM, Royal Dutch Air Lines. At this luncheon, we witnessed another "First." All the Past Ladies Chairmen were honored in a very special way by being seated at the Speakers Table and by being presented with a special gift. The Past Ladies Chairmen were grateful and showed deep appreciation for being remembered in this very special way. Thanks to Mr. R. C. Trees, representing the Udylite Corporation, who so generously sponsored this delicious luncheon.

Tuesday was the day each and everyone was anxiously waiting for. "A Trip to Disneyland." Everyone all over the country heard about this unusual and wonderful spot of reality and fantasy. All men, women and children became just "children." You saw the old and the young viewing "Tomorrowland," a blue print of the future with space stations and rocket ships of 1987; "Adventureland," where an explorer's boat takes you along tropical jungle rivers; "Fantasyland," where the storybook classics come to life; "Frontierland," with its stagecoaches and wagons. We rode on the Monorail trains, went down into the submarine and lived a thrilling experience around the mountain. All this was full of excitement and thrills and it was an outing which all of us will remember always.

Wednesday was another eventful day. We had a very special luncheon at the "Sportsmen's Lodge." We saw the "First" Fall showing of the Don Loper Fashion Show. Thanks to the following companies for sponsoring this colorful affair: California Rack Company; C & C Buff Company; Chemical Mfg. Company; Crown Chemical & Engineering Company; Diversified Plastics & Lead, Inc.; Glo-Quartz Electric Heater Company, Inc.; Harshaw Chemical Company; Industrial Rack Company; Kelite Corporation; MacDermid, Inc.; Mefford Chemical Company; Pennsalt Chemicals Corporation; Sundmark Supply Company; Wildberg Bros. Smelting & Refining Company and Products Finishing.

Wednesday night was again a "gala" evening. The floor show was most entertaining and delightful, which was followed by a real "peppy orchestra." A perfect closing for a perfect day.

Thursday was another day filled with activity and excitement. We participated in a Motion Picture Studio Tour in Hollywood, then to the Farmers' Market, which is one of the picturesque California versions of a shopping center. We found ourselves in many lands of glamorous settings and returned to our hotel with packages tucked carefully in our shopping bags.

We quickly changed into our very best "attire" to attend a lovely cocktail party. This jolly and colorful event, with its tables heaped with many delicious foods and drinks was sponsored by the Metal Finishing Suppliers' Association. We then went into the Pacific and Sierra Rooms, for the climax of the Convention—"The Annual Banquet and Dance." The food was delicious and the music was superb! A perfect closing of the 47th Annual Convention of the American Electroplaters' Society in Los Angeles.

Thus ended the well-organized, so ably executed Convention in the City of the Angels. Mrs. Beckwith and her Co-Chairman, Mrs. Painter and their entire Los Angeles Committee entertained the ladies in a royal fashion. They made the ladies feel *wanted* at the Convention. Their graciousness and hospitality were woven into a well-organized and profitable program executed so efficiently and "chucked" full of fun.

The ladies felt that each Convention City finds something new to offer and enlarges upon the best of the previous ideas.

In behalf of all the ladies who attended the Convention in the beautiful City of the Far West, may I extend to Mrs. Beckwith and her able Committee a most grateful "Thank You," and may it be resolved that their graciousness, hospitality and generosity be remembered as an important part of the First Convention held west of the Mississippi River.

BOSTON IN 1961

Now—what about next year? We are expecting great things from the Boston Ladies. That will be the best Convention in 1961. I am hoping that it will again be my pleasure and privilege to greet all of you and many more in Boston, with Marge Swift!

AMERICAN ELECTROPLATERS' SOCIETY, INC.

AMERICAN BUILDING • 443-445 BROAD STREET • NEWARK 2, N. J.

♦

1960-1961

NATIONAL OFFICERS

DR. W. ANDREW WESLEY
The International Nickel Company, Inc.
PRESIDENT

CHESTER G. BORLET
Grand Rapids Brass Company
FIRST VICE PRESIDENT

MANUEL BEN
General Motors Corporation
SECOND VICE PRESIDENT

FRANK O. BEUCKMAN
Eastman Kodak Company
THIRD VICE PRESIDENT

RALPH D. WYSONG
Studebaker-Packard Division
IMMEDIATE PAST PRESIDENT

JOHN P. NICHOLS
American Electroplaters' Society, Inc.
NATIONAL EXECUTIVE SECRETARY

♦

1960-1961

RESEARCH COMMITTEE LEADERSHIP

DR. DONALD G. FOULKE
Sel-Rex Corporation
CHAIRMAN

DR. HAROLD J. WIESNER
Bendix Corporation
VICE CHAIRMAN RESEARCH

RAYMOND L. MITCHELL
Mitchell-Bate Company
VICE CHAIRMAN FINANCE

JOHN P. NICHOLS
American Electroplaters' Society, Inc.
SECRETARY-TREASURER

DR. WILLIAM BLUM
Consultant
HONORARY MEMBER

♦

CLYDE KELLY
American Plating Company
DISTRICT SUPERVISOR

CLEVELAND F. NIXON
General Motors Corporation
DISTRICT SUPERVISOR

CLARENCE H. SAMPLE
The International Nickel Company, Inc.
DISTRICT SUPERVISOR

JAMES D. THOMAS
General Motors Corporation
DISTRICT SUPERVISOR

DR. E. L. BOWERMAN
Sylvania Electrical Products, Inc.
DISTRICT SUPERVISOR

YOUTHFUL MEMORIES MADE AT AES's LOS ANGELES ODYSSEY

by

JOHN P. NICHOLS JR.

(1) Younger conventioneers line up for bus to the day's outing. (2, 3 & 4) Youths take in the sights at the Museum of Railroading at Griffith Park. (5) Judy and Joy Woods, and Tim and Peter McCoy at Griffith Park. (6) AES Youngsters see the famed Farmers' Market. (7) Scott and Terry Roof and Jim Cummings (center) at Farmers' Market. (8) Sharon Strow, Gordon Saskin, Arthur Max and Peg Trook pause during their rounds of Farmers' Market. (9) Seeing the sights at Marineland of the Pacific. (10) Knott's Berry Farm was one of the highlights of the Youngsters' program. (11) Affable Children's Program Chairman E. C. Bosl with his charges on the boat ride around Long Beach Harbor. (12) Return to the hotel at the end of memorable activities at the 1960 AES Convention.

AES NEWS

SOUTHWEST AND FAR WEST AES REGIONAL COUNCILS CREATED AT LOS ANGELES

At a meeting held in the Dallas Room on Tuesday, July 26, 1960, representatives of six AES Branches voted to form a regional AES group, the Society's seventh, to be known as the Southwest Regional Council. The council is composed of the Dallas-Ft. Worth, Denver, Kansas City, Houston, Phoenix and Wichita Branches.

Aside from the formation of the Southwest Regional Council at the recent Los Angeles Convention of the Society, the Far Western Branches created an informal Far Western Educational Council.

Principally composed of the Branch heads and Educational Chairmen of the British Columbia, Los Angeles, Portland, San Francisco and Seattle-Puget Sound Branches, the main mission of this eighth AES Regional Group will be to expedite the procurement of suitable technical speakers, at even more effective monthly Branch educational meetings.

DIXIE'S APPRECIATION MANIFESTED TO FULFORTH

Honoring Past President Frederick Fulforth upon his achievement of AES Honorary Membership, the Dixie Regional Council through the courtesy of Blue Ridge Branch Founder T. R. Boggess, presented him with a silver plated gavel. Above, Mr. Fulforth at left receiving said gavel from Mr. Boggess.

GLOVER APPOINTED 1960-1961 LAW COMMITTEE HEAD

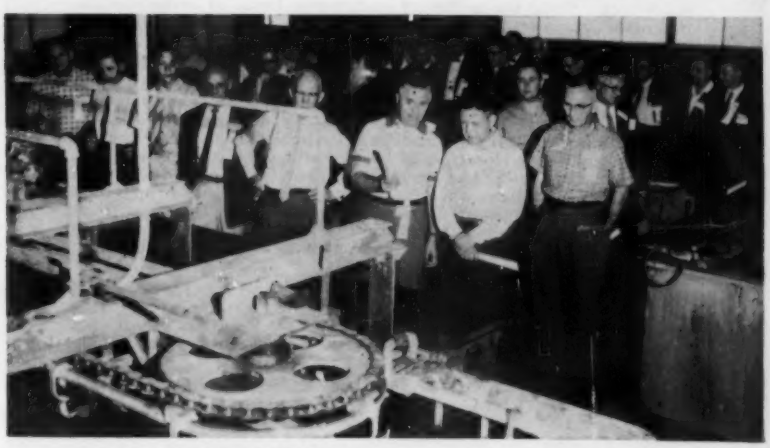
To head the 1960–1961 Law Committee, National President Wesley has reappointed Manson Glover of the Boston Branch. Mr. Glover was Parliamentarian at the Los Angeles Annual Meeting.

PROCTOR AWARD DONORS AT FIRST PRESENTATION

Arriving in Los Angeles just as the Farewell Banquet was about to start, Mr. and Mrs. William Osborn Preston, donors of the Charles Henry Proctor Memorial Leadership Award, were actually present when that Award, for the first time, was presented since its 1959 inaugural. Above Mr. and Mrs. Preston, son-in-law and daughter respectively of AES's Founding Father, with National President W. Andrew Wesley, right, and Past President Walter L. Pinner, first Proctor Award winner.

PHOENIX BRANCH FOUNDER HONORED

William L. Griff, a Founding Father and first President of AES's new Phoenix Branch, recently transferred to Los Angeles for business reasons. As a mark of respect and affection, the Phoenix Branch presented Mr. Griff with a briefcase and a Branch Honorary Membership at the Supreme Society meeting July 28. Above, the presentation. Mr. Griff is at left with Branch Secretary James Weaver.



PLANT TOUR DURING THE LOS ANGELES CONVENTION

Some of the AES members who visited the plant of the McCulloch Corporation on the morning of the last day of the Convention, July 28.

INAUGURAL STATEMENT

OF

DR. W. ANDREW WESLEY

PRESIDENT

AMERICAN ELECTROPLATERS' SOCIETY, INC.

THE TRUE SIZE of the metal finishing industry is not known. It is represented in every plant the country over in which products comprised in whole or in part of metal are manufactured. Members of the American Electroplaters' Society are employed not only in making parts for automobiles but for every metal product in the book, from apple corers to zippers in civilian applications and from jet aircraft to weapons for the military. The industry has been having a good year. Its products are becoming more diversified every season so that only a general recession can cause a serious set-back to metal finishing.

The AES is not a trade association. It is a non-profit educational organization whose goal is the advancement and dissemination of knowledge of the arts and sciences of metal finishing. In what directions does the Society look to expansion of its activities in the future? This is a question Americans want answered today by every one of our educational institutions.

I visualize an expansion of metal finishing processes in several new directions following a period of intensive research and development already underway. One is in chemical and electrochemical "machining" or "milling" as it is sometimes called. Methods for rapid and controlled removal of metal for dissolution are already commercial in the case of light metal alloys, such as those of aluminum and magnesium used in the aircraft industry. There is no fundamental reason why processes cannot be developed for other commercial alloys.

A second area is in the prevention of failure of metal parts subjected to high stresses. As alloys are designed for new, high-level mechanical or physical properties, industry often finds that susceptibility to embrittlement or cracking may have been introduced as a result of changes in composition, structure or heat-treatment. It appears from recent studies that hydrogen embrittlement may be involved in failures previously not ascribed to hydrogen. Stress corrosion cracking continues to baffle scientists. Even the ordinary endurance limit of some metals has been found to be lower when tested in air than when tested in a vacuum.

Study of such phenomena is revealing that in many instances the damage actually originates at or through the surface of the metal. This is the reason why I believe that a promising direction for the progress of the metal finishing industry is to seek to insulate new high strength alloys from embrittlement or corrosion fatigue by application of metallic or chemical compound coatings. This will tend to give freedom to design the basis metal to take fullest advantage of its mechanical properties without worrying about damage from without. On the other hand, the coating can be made to supply heat reflectivity, electrical conductivity, beautiful appearance or other attribute in which the basis metal is lacking.

All surface coatings and treatments fall within the scope of the art and science of metal finishing. The AES can look to future expansion of its research and educational activities in the directions I have outlined. The Society welcomes and publishes technical papers and symposia presenting new information on developments in any field of use of metal finishing processes.

AES's NEXT INDUSTRIAL FINISHING EXPOSITION: ST. LOUIS 1964

American Electroplaters's Society's next edition of its widely anticipated Industrial Finishing Expositions will be held in St. Louis, Missouri, June 16–18, 1964, as a result of the Executive Board recommendation to that end unanimously approved and enacted by the Supreme Society, the AES's summit governing council, at its Annual Meeting held in Los Angeles, July 28, 1960.

As enacted, the Board's recommendation provided that said Sixth Industrial Finishing Exposition be conducted at the famed Heil Auditorium of that community on those dates, concurrently with the AES's 51st Annual Convention that will be staged in that Mississippi River municipality June 15–18, 1964, with the Society's St. Louis Branch as host.

As usual, the Sixth Industrial Finishing Exposition will be created and conducted under the policy and procedural responsibility of the Executive Board, with accomplishment thereof suitably delegated to an Exposition Committee headed by an experienced Chairman of the Board's selection.

♦

Daniel Gray

SUPREME SOCIETY CITES SYRACUSE'S DANNY GRAY

Proposed by the Syracuse Branch, a resolution was enacted and promulgated by the Supreme Society at its Annual Meeting held in Los Angeles July 28, commending Daniel Gray of the Syracuse Branch for effective long-time service to the industry and to the Society, and expressing best wishes for his early and full recovery to good health.

Mr. Gray, affectionately known as "Danny", has served the electroplating industry for some 42 years. He served on the Editorial Board; helped create three AES Branches in Upstate New York and served as keynote speaker of an AES National Convention, to name a few of his contributions to the Society.

MIAMI BEACH AS SITE OF AES's 53rd ANNUAL CONVENTION

The Supreme Society, at its Los Angeles Annual Meeting July 28, applying its policy of selecting Convention sites six years in advance instead of four years as heretofore, tapped the Dixie Regional Council as Host of the 1966 AES Annual Convention to be held in Miami Beach, Florida.

Hence AES will hold its 48th Annual Convention in historic Boston in 1961—will journey to the Middle West for its 1962 Convention in Milwaukee—proceed "down by the Sea in '63" for the Atlantic City Convention that year—meet in St. Louis in 1964—move to Knickerbocker in 1965 for AES's Annual Convention in the Empire City of its creation—then hold its Convention in Miami Beach in 1966.

And the Indianapolis Branch will host the NINTH INTERIM MEETING. It will be held in that city January 14, 1962.

On February 11, 1961, the New England Regional group, patriarch of AES's existent regional bodies, will host the Society's EIGHTH INTERIM MEETING at the Statler Hotel in Hartford, Connecticut, with Allen Ferguson and Richard C. Barrett of the Bridgeport Branch as Co-Chairmen.

Wright W. Wilson

WRIGHT W. WILSON WINS PAST PRESIDENTS AWARD

Inaugurated in 1960, the "Order of Past Presidents Award" of that organization was presented in absentia to Wright W. Wilson of Detroit at the Annual Meeting of the Supreme Society held on July 28 at Los Angeles, California.

Selected for the Award for outstanding service to the Society during 1959–1960, Mr. Wilson was General Chairman of the mammoth Golden Jubilee Convention held in Detroit June 15–19, 1959, concurrently with the Fifth Industrial Finishing Exposition and Fifth International Conference on Electrodeposition and Metal Finishing.

Past President William J. Neill of Columbus, Ohio spearheaded the genesis of the Award and its design and presentation.

BRANCH PRESIDENTS NAMED TO PROCTOR AWARD COMMITTEE

To round out the 1960–1961 Charles Henry Proctor Memorial Leadership Award Selection Committee already composed of 1) the donors, namely Mr. and Mrs. William O. Preston, 2) the National President of the Society, 3) the National Executive Secretary, 4) the Chairman of the Research Committee and 5) the Chairman of the Order of Past Presidents, the Executive Board has now appointed to that Committee, the Presidents of the AES's Kansas City and Syracuse Branches.

AES ORGANIC FINISHING PAPER AWARD CREATED

To its present roster of eight Paper Awards, AES has now added a ninth such Award as a result of the sponsorship of an Organic Finishing Award by The O'Brien Corporation Industrial Division (South Bend, Indiana) approved by the Executive Board of the Society at its recent Los Angeles meeting.

Consisting of a $50 cash award plus a handsome laminated certificate, the new Award will annually be bestowed to the paper on organic finishing published in PLATING MAGAZINE or TECHNICAL PROCEEDINGS during the fiscal year adjudged best by the AES Paper Awards Committee.

EDITING H-VW-M OFFICIAL CONVENTION NEWS

Two men put in long hours and hard work so AES convention goers could be greeted each morning by the Official Convention News, published by Hanson-Van Winkle-Munning Company (Alert Supply Co. in the West). Above are the news sleuths and editors, Richard V. Morrison, right, and Howard Gauvain, both of O. S. Tyson and Company, H-VW-M's advertising agency.

1960 EDITION OF "TECHNICAL PROCEEDINGS" BEING READIED

Embodying each of the 31 technical and scientific papers on electroplating, metal finishing, organic coating and allied arts prepared by experts and presented at the educational sessions of the AES's 47th Annual Convention held in Los Angeles, July 25–28, 1960, the AES's widely awaited book, TECHNICAL PROCEEDINGS (1960 Edition), is now in process of preparation. The transcript of the discussion that attended the delivery of each paper will also be included in that voluminous treasure chest of knowledge.

Every reasonable effort is being made to have the book make its appearance by late Autumn 1960 despite the late date of this year's National Convention.

A copy of the book will then issue to every AES member in good standing as at November 1, 1960. A limited quantity of extra copies will expectedly be available thereafter for sale to interested non-members, on an international scale, on a first come-first served basis so long as that supply lasts.

NEWARK BRANCH ANNOUNCES GRAHAM AND MARZANO FOR METROPOLITAN REGIONAL

The AES Metropolitan Regional Group will hold its second annual technical session on the evening of September 16 in Newark at the Robert Treat Hotel. This group is composed of the New York and Newark Branches and the annual meetings are hosted alternately by the two Branches. The inaugural meeting was held last year in New York.

Technical Chairman F. J. LaManna will present two speakers. Dr. A. Kenneth Graham, 1959 winner of the AES Scientific Achievement Award and president of Graham, Savage & Associates, Inc., will speak on "Fundamentals of Electroplating" and Christopher Marzano, Amphenol Electronics Corporation, will discuss "Plating on Difficult Metals."

A Dutch Treat Dinner at 6:30 p.m. will precede the educational session and refreshments will be served at its close.

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BOSTON ANNUAL NOW HELD IN FALL

Boston Branch's annual big day moves from the spring to the fall with its 24th Annual Banquet and Technical Session at the Hotel Statler-Hilton in Boston on September 17.

Three speakers will discuss AES Research at the afternoon technical session. The speakers will be James D. Thomas, Clyde Kelly, and Cleveland F. Nixon. While the educational program is in progress, the ladies will attend a matinee performance of a pre-Broadway show.

The banquet, featuring a roast beef dinner, entertainment, dancing and door prizes promises to be better than ever.

DALLAS-FT. WORTH TO PRESENT ITS FIRST ACHIEVEMENT AWARD

The Dallas-Ft. Worth Branch will hold its Annual Meeting Wednesday, September 21, 1960 in the Texan Room at the Howard Johnson Turnpike Inn in Dallas. Honored guest speaker will be Frank Beuckman, AES's National Third Vice President. Ezra A. Blount, editor of *Products Finishing*, will present views on "Metal Finishing in Japan" with most recent aspects garnered from his tour of Japan this summer.

A formal installation of 1960-1961 Branch Officers will be conducted and the first Dallas-Ft. Worth Branch Achievement Award will be presented to a Branch member who has performed outstanding service to the local Branch. Latest working projects for the Southwestern Regional Council will be reviewed.

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ST. JOSEPH VALLEY TO HOST MIDWEST REGIONAL CONFERENCE

St. Joseph Valley Branch will host on October 29 the Second Annual Conference of the AES Midwest Regional Council. It is to be held at the University of Notre Dame in South Bend, Indiana.

The morning educational session will start at 10 o'clock in the Engineering Auditorium of the University. After lunch in the Mahogany Room of the Morris Inn, with special speaker, three workshop sessions on mechanical finishing, electroplating and organic finishing will be held. Sessions of this nature are always highly informative and have proved to be a popular feature.

AES's REGIONAL GROUPS AND COUNCILS

(AS OF SEPTEMBER 1, 1960)

DIXIE GROUP
- Blue Ridge Branch
- Memphis-Midsouth Branch
- Miami Branch
- Southeastern Branch

EMPIRE STATE GROUP
- Buffalo Branch
- Capitol District Branch
- Mohawk Valley Branch
- Rochester Branch
- Southern Tier Branch
- Syracuse Branch

MIDWEST COUNCIL
- Chicago Branch
- Milwaukee Branch
- Mississippi Valley Branch
- Rockford Branch
- St. Joseph Valley Branch
- St. Louis Branch

METROPOLITAN GROUP
- Newark Branch
- New York Branch

NEW ENGLAND GROUP
- Bridgeport Branch
- Hartford Branch
- New Haven Branch
- Springfield Branch
- Waterbury Branch

TRI-STATE GROUP
- Columbus Branch
- Cincinnati Branch
- Dayton Branch
- Indianapolis Branch
- Louisville Branch

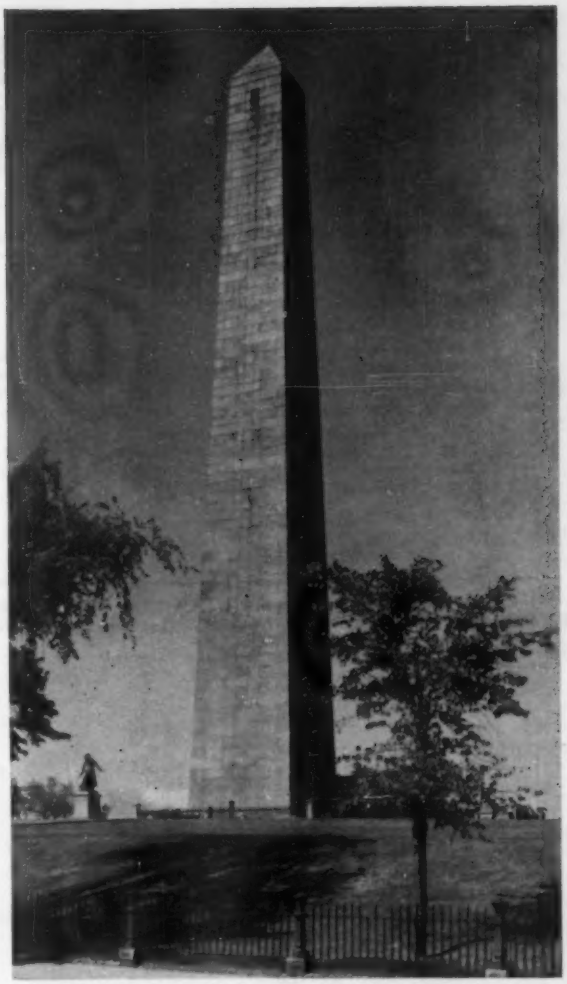
SOUTHWEST COUNCIL
- Dallas-Fort Worth Branch
- Denver Branch
- Houston Branch
- Kansas City Branch
- Phoenix Branch
- Wichita Branch

FAR WEST EDUCATIONAL COUNCIL
- British Columbia Branch
- Los Angeles Branch
- Portland Branch
- San Francisco Branch
- Seattle-Puget Sound Branch

REMINDERS TO AES CHARTERED MEMBERS

1. **The due-date for the payment of your Branch's Per Capita Tax, in full, for the 1960-1961 fiscal year (July 1, 1960-June 30, 1961) is *September 1, 1960*.**
2. **The list of your Branch's duly elected Branch Delegates and Alternate Delegates for 1960-1961 is due in the hands of the National Executive Secretary by or before *November 7, 1960*. The tenure (term of office) of these elected Delegates and Alternates is from the FIRST Branch meeting immediately following the 1960 Annual Meeting of the Supreme Society (Los Angeles, July 28, 1960) to the first Branch Meeting immediately following the 1961 Annual Meeting of the Supreme Society (Boston, June 23, 1961) or until their successors are duly elected by your Branch. Your list should be filed on the official form that has been provided to you by National Headquarters, and must be signed by both the Branch President and Branch Secretary.**
3. **Your Branch, via its accredited Delegates, has been invited to nominate any qualified member of the Society whom it chooses for consideration for the AES Scientific Achievement Award for 1960-1961. Your choice must be supported by *seven* copies of a statement of your nominee's qualifications. These are all due in the hands of the National Executive Secretary by not later than *October 15, 1960* by the Award's regulations. No nominations will be accepted after that date.**
4. **Your Branch, via its accredited Delegates, has been invited to nominate any qualified member of the Society whom it chooses for consideration for AES Honorary Membership. Your choice must be supported by six copies of a statement of qualifications. These are all due in the hands of the National Executive Secretary by not later than *November 15, 1960* by the recorded rules of the Supreme Society. No nominations will be accepted after that date.**
5. **Your Branch, through its President of record, will be invited to nominate any member of the Society whom it chooses for consideration for the Charles Henry Proctor Memorial Leadership Award for 1960-1961. More information soon.**
6. **If your Branch is among those very few Branches that have delayed to now in appointing a Branch Research Finance Chairman to spearhead your Branch's effort to stimulate Sustaining Membership applications by industrial companies in your area, with the help of the Regional Research Finance Chairman for your territory, please do so promptly and submit his name to the National Executive Secretary's office at earliest possible time for processing.**

AES MEMBERS TO CONVERGE UPON HISTORIC BOSTON JUNE 18-23, 1961



The 200-foot Bunker Hill monument in Charleston, Massachusetts, commemorates the historic battle of the American Revolution.

For the third time in the fifty-one year history of American Electroplaters' Society, Inc. (AES), the Society will conduct an AES National Convention in Boston (June 18–23, 1961) with the Society's famed Boston Branch as Host Branch. Convention site will be the Statler Hotel pictured in an adjoining column, and head of that 48th Annual Convention will be Louis V. Gagnon as General Convention Chairman.

An outstanding Educational Sessions Program is in preparation for the Editorial Board by a competent Host Branch Educational Sessions Committee headed by Educational Chairman George J. Marotta, Western Electric Company, with Charles Levy, Gillette Safety Razor Company, as Educational Co-Chairman.

Features of that Program will not only be the third "William Blum Lecture" that, at the Boston Convention, will be delivered by Dr. Charles L. Faust, Battelle Memorial Institute, third winner of the "AES Scientific Achievement Award," but also a two-session, eight-paper "Finishing of Light Metals" symposium being programmed for that Convention by Dr. Gerald H. Kissin, Kaiser Aluminum & Chemical Corporation, a special member of the Host Branch Educational Sessions Committee. The balance of the program will run the gamut of significant phases of electroplating, metal finishing, organic coating and allied arts.

Then there will be much fellowship and fun to occupy the "off duty" hours of the host of AES members expected, from far and near, in Bostontown, June 18–23, 1961. And a memorable Ladies Program is also in the making under Ladies Chairman Marjorie Swift.

So start now to plan for AES's long-anticipated Convention in historic Boston, veritably the ". . . hub," according to Oliver Wendell Holmes, "of the solar system."

Boston's Hotel Statler as seen from the lake on Boston Common.

FINANCIAL REPORT

FOR THE TWELVE-MONTH FISCAL PERIOD

JULY 1, 1959—JUNE 30, 1960

AMERICAN ELECTROPLATERS' SOCIETY, INCORPORATED
NEWARK 2, NEW JERSEY

We have examined the balance sheets of the General Fund and Research Fund of American Electroplaters' Society, Incorporated as of June 30, 1960, and the related statements of income and principal for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheets and statements of income present fairly the financial position of American Electroplaters' Society, Incorporated at June 30, 1960, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Newark, New Jersey
August 1, 1960

CLYDE A. ZUKSWERT & CO.
Certified Public Accountants

EXHIBIT A

AMERICAN ELECTROPLATERS' SOCIETY, INCORPORATED
Comparative Balance Sheet—General Fund—June 30, 1960 and 1959

ASSETS	June 30, 1960 "Society" Control	June 30, 1960 "Plating" Control	June 30, 1960 Total	June 30, 1959	Increase Decrease*
CURRENT ASSETS:					
Demand deposits	$ 11,955.67	$11,373.40	$ 23,329.07	$ 14,922.88	$ 8,406.19
Petty cash	50.00		50.00	50.00	
United States Treasury Bonds:					
$10,000.00 Series K (redemption value)	9,740.00		9,740.00	9,700.00	40.00
$15,000.00, 3¼%, 6/15/83-78 at cost (market value $13,603.12)	15,682.20		15,682.20	15,682.20	
Time deposits	110,000.00		110,000.00	110,000.00	
Accounts receivable:					
Per capita tax	120.30		120.30		120.30
Advertising, books, reprints, supplies and miscellaneous	521.55	3,329.39	3,850.94	5,213.14	1,362.20*
Advances, conventions and exhibitions	2,000.00		2,000.00		2,000.00
Due from Research Fund	330.17	142.00	472.17		472.17
Accrued interest receivable	525.00		525.00	762.50	237.50*
Deferred charges	729.34	6,879.63	7,608.97	6,113.62	1,495.35
Total current assets	$151,654.23	$21,724.42	$173,378.65	$162,444.34	$10,934.31
CONTRA ACCOUNTS:					
Due from "Society" control	$	$61,843.09	$ 61,843.09	$ 57,322.36	$ 4,520.73
Due to "Plating" control	(61,843.09)		(61,843.09)	(57,322.36)	(4,520.73)
DEPOSIT, AMERICAN AIRLINES	$ 425.00	$	$ 425.00	$ 425.00	$
CARL E. HEUSSNER AWARD FUND:					
Fidelity Federal Savings and Loan Association, Glendale, California	$ 3,000.00	$	$ 3,000.00	$ 3,000.00	$
Totals	$ 93,236.14	$83,567.51	$176,803.65	$165,869.34	$10,934.31
LIABILITIES AND PRINCIPAL					
CURRENT LIABILITIES:					
Accounts payable	$ 278.35	$ 6,130.70	$ 6,409.05	$ 5,291.23	$ 1,117.82
Accounts receivable—credit balances		38.88	38.88	8.00	30.88
Foreign advances				12.65	12.65*
Accrued expenses	15.00		15.00	79.55	64.55*
Deferred income	12.05		12.05	196.00	183.95*
Total current liabilities	$ 305.40	$ 6,169.58	$ 6,474.98	$ 5,587.43	$ 887.55
CARL E. HEUSSNER AWARD FUND	$ 3,112.35	$	$ 3,112.35	$ 3,262.79	$ 150.44*
GENERAL FUND PRINCIPAL, EXHIBIT D	$ 89,818.39	$77,397.93	$167,216.32	$157,019.12	$10,197.20
Totals	$ 93,236.14	$83,567.51	$176,803.65	$165,869.34	$10,934.31

NOTE: The policy of the Society is to charge all purchases of office furniture and equipment to expense.

COMPARATIVE STATEMENT OF INCOME
GENERAL FUND—"SOCIETY" CONTROL

EXHIBIT B — **For the years ended June 30, 1960 and 1959**

	Budget	Actual —Year Ended June 30,— 1960	1959	Increase Decrease*
INCOME:				
Per Capita Tax and Dues (Pro rata share):				
Active members	$30,940.00	$30,853.02	$18,937.87	$11,915.15
Members-at-large	1,856.00	1,900.36	1,644.02	256.34
Sustaining members	840.00	870.75	784.35	86.40
Sales of Publications, Etc.:				
Technical "Proceedings"	4,000.00		3,907.00	3,748.50
Past editions		1,018.00)		
1959 edition		6,637.50)		
Reprints (1959) Technical "Proceedings", Note 1		2,478.39		2,478.39
Books, other society publications	3,000.00	7,240.44	4,108.18	3,132.26
Sales to Branches:				
Membership insignia, etc.	200.00	345.86	824.51	478.65*
Other Income:				
Mailing services	1,500.00	988.32	576.28	412.04
Interest on investments	5,000.00	5,300.38	5,641.00	340.62*
Miscellaneous		28.64	29.07	.43*
Total income	$47,336.00	$57,661.66	$36,452.28	$21,209.38
EXPENSES:				
Publications, Etc.:				
Technical "Proceedings"	$25,000.00	$	$	$
Printing, engraving and mailing (1959)		24,863.79)		
Postage for sold copies (1959)		246.55)	14,869.90	10,324.38
Promotion data (1959)		83.94)		
Reprints Technical "Proceedings" (1959), Note 1		1,765.13		1,765.13
Books, other society publications	2,500.00	5,546.41	3,044.35	2,502.06
Mailing services	1,000.00	746.10	457.14	288.96
Headquarters—Personnel:				
Staff salaries (Pro rata share)	21,250.00	20,267.82	19,083.42	1,184.40
Social security and hospitalization	900.00	652.04	521.68	130.36
Travel	2,833.34	2,575.56	1,897.17	678.39
Headquarters—Office:				
Office expenses (Pro rata share)	6,866.66	6,686.47	5,892.69	793.78
Furniture and equipment (Pro rata share)	866.00	447.86	207.89	239.97
National Officers:				
Travel	4,600.00	620.77	1,726.21	1,105.44*
Awards, Convention Expense, Manuals, Memberships, Proceedings,				
Reporters, Publications, Etc.	8,500.00	4,626.52	4,861.08	234.56*
Christmas fund	375.00	375.00	362.99	12.01
Interim meeting	1,250.00	378.37	913.40	535.03*
Committee Meeting Expense	750.00	345.81	413.57	67.76*
Branch Supplies	500.00	336.23	692.84	356.61*
Total expenses	$77,191.00	$70,564.37	$54,944.33	$15,620.04
EXCESS EXPENDITURES OVER INCOME	$29,855.00	$12,902.71	$18,492.05	$ 5,589.34*

NOTES: 1. The established custom, prior to this period, was to charge cost of all reprints and to credit receipts from sales thereof, both to "Plating". Beginning July 1, 1959, Technical "Proceedings" expense and income were included in "Society" operations.
2. The Supreme Society has authorized withdrawal from General Fund of an amount not to exceed $29,855.00 to balance budget.
3. The policy of the Society is to charge all purchases of office furniture and equipment to expense.

COMPARATIVE STATEMENT OF INCOME
GENERAL FUND—"PLATING" CONTROL

EXHIBIT C — **For the years ended June 30, 1960 and 1959**

	Budget	Actual —Year Ended June 30,— 1960	1959	Increase Decrease*
INCOME:				
Advertising (except classified)	$	$162,950.00	$153,007.00	$ 9,943.00
Less:				
Discounts allowed	$	$ 2,578.36	$ 2,410.70	$ 167.66
Agency commissions		22,226.99	20,617.60	1,609.39
Total deductions	$	$ 24,805.35	$ 23,028.30	$ 1,777.05
Net	$140,000.00	$138,144.65	$129,978.70	$ 8,165.95

EXHIBIT C (continued)

Subscriptions:				
Members (Pro rata share of per capita tax)	$ 14,000.00	$ 13,949.45	$ 14,030.17	$ 80.72*
Members-at-large (Pro rata share of dues)	464.00	475.09	547.16	72.07*
Sustaining members (Pro rata share of dues)	620.00	645.00	581.00	64.00
Non-members	7,000.00	7,311.05	6,748.80	562.25
Total subscriptions	$ 22,084.00	$ 22,380.59	$ 21,907.13	$ 473.46
Other Sales:				
Reprints, Note 1	$ 5,000.00	$ 3,740.88	$ 3,486.93	$ 253.95
Classified advertising	350.00	648.40	519.40	129.00
Miscellaneous		1,069.79	781.62	288.17
Total other sales	$ 5,350.00	$ 5,459.07	$ 4,787.95	$ 671.12
Total income	$167,434.00	$165,984.31	$156,673.78	$ 9,310.53
EXPENSES:				
Monthly Publication Expense:				
Printing costs	$ 84,000.00	($ 71,045.41	$ 73,049.19)	$ 2,296.48*
Other costs		(4,864.84	5,157.54)	
Headquarters—Personnel:				
Salaries (Pro rata share)	63,750.00	60,792.52	57,249.52	3,543.00
Social security and hospitalization	2,700.00	1,593.91	1,393.74	200.17
Commissions, Advertising Manager	1,750.00	1,646.38	1,049.31	597.07
Travel	5,666.66	5,149.95	3,793.03	1,356.92
Headquarters—Office:				
Office expenses (Pro rata share)	13,733.34	12,202.97	11,465.86	737.11
Furniture and equipment (Pro rata share)	434.00	223.95	415.74	191.79*
Promotional advertising and Audit Bureau of Circulation	3,800.00	2,575.05	2,808.57	233.52*
Reprints, Note 1	3,000.00	2,626.84	2,366.13	260.71
Total expenses	$178,834.00	$162,721.82	$158,748.63	$ 3,973.19
EXCESS OF INCOME OVER EXPENSES, Note 2	$(11,400.00)	$ 3,262.49	$ (2,074.85)	$ 5,337.34

NOTES: 1. The established custom, prior to this period, was to charge cost of all reprints and to credit receipts from sales thereof, both to "Plating". Beginning July 1, 1959, Technical "Proceedings" expense and income were included in "Society" operations.
2. The Supreme Society has authorized withdrawal from General Fund of an amount not to exceed $11,400.00 to balance budget.
3. The policy of the Society is to charge all purchases of office furniture and equipment to expense.

EXHIBIT D

STATEMENT OF GENERAL FUND PRINCIPAL
For the year ended June 30, 1960

	"Society" Control	"Plating" Control	Total
BALANCE, JULY 1, 1959	$ 82,738.23	$74,280.89	$157,019.12
ADDITIONS:			
Income from Detroit Convention	1,144.49		1,144.49
Income from Detroit Industrial Finishing Exposition	20,007.42		20,007.42
Excess of income over expenses for the year ended June 30, 1960, per Exhibit C		3,262.49	3,262.49
Total	$103,890.14	$77,543.38	$181,433.52
DEDUCTIONS:			
AES Scientific Achievement Award	$ 500.00	$	$ 500.00
Excess of expenses over income for the year ended June 30, 1960, per Exhibit B	12,902.71		12,902.71
Expended against supplementary budget for Golden Jubilee	669.04		669.04
Payment of disputed advertising commission in excess of amount reserved in prior year		145.45	145.45
Total	$ 14,071.75	$ 145.45	$ 14,217.20
BALANCE, JUNE 30, 1960	$ 89,818.39	$77,397.93	$167,216.32

EXHIBIT E

COMPARATIVE BALANCE SHEET—RESEARCH FUND
June 30, 1960 and 1959

	June 30, 1960	June 30, 1959	Increase Decrease*
ASSETS			
CURRENT ASSETS:			
Demand deposit	$ 29,234.92	$ 29,114.28	$ 120.64
Time deposits	84,000.00	84,000.00	
Accounts receivable		8.35	8.35*
Accrued interest receivable	412.50	995.00	582.50*
Totals	$113,647.42	$114,117.63	$ 470.21*
LIABILITIES AND PRINCIPAL			
CURRENT LIABILITIES:			
Due to General Fund, "Society" Control	$ 330.17	$	$ 330.17
Due to General Fund, "Plating" Control	142.00		142.00
RESEARCH FUND PRINCIPAL, EXHIBIT G	113,175.25	114,117.63	942.38*
Totals	$113,647.42	$114,117.63	$ 470.21*

COMPARATIVE STATEMENT OF INCOME—RESEARCH FUND

EXHIBIT F — **For the years ended June 30, 1960 and 1959**

	Budget	Actual –Year Ended June 30,– 1960	Actual –Year Ended June 30,– 1959	Increase Decrease*
INCOME:				
Sustaining membership dues and subscriptions (Pro rata share)	$30,000.00	$30,734.25	$27,684.65	$3,049.60
Per capita tax (Pro rata share)	7,000.00	6,974.74	7,015.07	40.33*
Member-at-large dues (Pro rata share)	200.00	237.55	273.60	36.05*
Branch contributions (American)		200.00	110.00	90.00
Sale of reprints	400.00	478.60	688.20	209.60*
Interest on investments	3,000.00	3,428.75	3,255.00	173.75
Contributions (other societies)		500.00		500.00
Miscellaneous income		.35	.15	.20
Research Fund reserve (Note)	10,445.00	10,445.00	6,700.00	3,745.00
Total income	$51,045.00	$52,999.24	$45,726.67	$7,272.57
EXPENSES:				
Payments to Canadian (Research Fund)	$ 6,560.00	$ 6,560.00	$ 6,400.00	$ 160.00
Payments to projects	39,285.00	32,442.43	31,395.15	1,047.28
Reprints—Cost of serial reports, etc.	1,250.00	1,165.72	156.67	1,009.05
Social security tax	150.00	26.89	118.17	91.28*
Travel expense	150.00		142.73	142.73*
Sustaining membership promotion, certificates, date plaques, etc.	400.00	509.91	313.38	196.53
Miscellaneous expense, including cost of postage and mailings, committee meetings, etc.	1,500.00	851.37	698.34	153.03
Office expense	1,500.00	1,500.00	1,500.00	
Audit and contingency	250.00	141.00	137.96	3.04
Foreign exchange fees		299.30	168.50	130.80
Total expenses	$51,045.00	$43,496 62	$41,030.90	$2,465.72
EXCESS INCOME OVER EXPENSES	$	$ 9,502.62	$ 4,695.77	$4,806.85

NOTE: Represents authorized appropriations from Research Fund Principal Account to balance budget.

STATEMENT OF RESEARCH FUND PRINCIPAL

EXHIBIT G — **For the year ended June 30, 1960**

BALANCE, JULY 1, 1959	$114,117.63	
ADDITION:		
Excess of income over expenses for the year ended June 30, 1960, per Exhibit F (includes appropriation transfer of $10,445.00)	9,502.62	
		$123,620.25
DEDUCTION:		
Transfer to budget income		10,445.00
BALANCE, JUNE 30, 1960		$113,175.25

STATEMENT OF RECEIPTS AND DISBURSEMENTS CANADIAN RESEARCH FUND

EXHIBIT H — **For the year ended June 30, 1960**

BALANCE, JULY 1, 1959 (THE DOMINION BANK, TORONTO, CANADA)		$ 2,099.27
RECEIPTS:		
American Electroplaters' Society, Research Fund	$6,560.00	
Branch contributions	200.00	
Sustaining membership dues	2,200.00	
Interest	20.13	
Total receipts		8,980.13
Total		$11,079.40
DISBURSEMENTS:		
Ontario Research Foundation	$8,560.00	
Discount and foreign exchange	.15	
Taxes	3.00	
Total disbursements		8,563.15
BALANCE, JUNE 30, 1960 (THE DOMINION BANK, TORONTO, CANADA)		$ 2,516.25

NOTE: Research Fund, American Electroplaters' Society, Incorporated, has paid per capita tax to American Electroplaters' Society, Incorporated, for twenty Canadian members at $4.70 each.

INTERSOCIETY NEWS

CHEMICAL MILLING, ELECTROFORMING, BARREL FINISHING, ON ASTME AGENDA

Technical sessions of the ASTME Western Engineering Conference and Exhibit in Los Angeles, November 14 to 18, will be held at the Ambassador Hotel, concurrent with the exposition at the Memorial Sports Arena.

Noted authorities from around the nation will cover such subjects as ceramic tooling, carbide tools, chemical milling, electroforming, plasmarc coating, precision barrel finishing, servomechanism machine tool controls, and numerical control retrofit of machine tools.

Two "Techtours" are also on the agenda. One on Tuesday, November 15, will include computer programmed machines in the small shop, and tape controlled turret drilling. The other, on Wednesday, November 16, will cover powder metallurgy.

Among the speakers at the sessions will be: Floyd Cox, manager, manufacturing research and development, Ryan Aeronautical Co., San Diego; William B. Johnson, industrial engineer, Rocketdyne Division, North American Aviation, Sherman Oaks, Calif.; and Raymond G. McCue, design engineer, design producibility dept., North American Aviation, Los Angeles.

Clarence L. Mehl, senior research engineer, Cincinnati Milling Machine Company, Cincinnati, Ohio; Fred A. Monahan, manager, applied mfgr. research and process development, Convair, San Diego; Donald A. Mosher, president, BMT Mfgr. Corp., Elmira Heights, New York; and William Pentland, research supervisor, Cincinnati Milling Machine Co. William Maxwell Wheildon, Jr., senior research engineer, research and development dept., Norton Company, Worcester, Mass.; Dr. Dimitri Kececioglu, assistant to the director of mechanical engineering, Allis-Chalmers Mfgr. Co., Milwaukee, and John L. Ellis, vice president, Sintercast Division, Chromalloy Corp., Yonkers, N.Y.

♦

MOORE TECHNICAL DIRECTOR OF COPPER ASSOCIATION

Dr. Charles H. Moore, of Indianapolis, Indiana, a nationally known expert in research organization, physical chemistry, and metal and metalloid product development, has been appointed technical director of the Copper Products Development Association, Inc.

Dr. Moore, who has been executive director of corporate research and development and manager of semiconductor operations for P. R. Mallory and Company, Inc., assumed his new duties on August 1.

As technical director of the Copper Products Development Association, Dr. Moore will head a broad program of research and development underwritten by copper producers of the free world to find new and improved uses for copper. This program, initiated earlier this year, already includes four major copper research studies under way at laboratories in this country and abroad.

The Copper Products Development Association was formed last December by six major American producers. Membership is open to all copper producing companies in the free world, and now stands at seventeen companies which have mining operations in Canada, Africa, South America, and Australia, as well as in the United States.

In taking the CPDA post, Dr. Moore will assume the direction and management of the copper research studies which Dr. Clyde Williams, technical director pro tempore, established at research laboratories in this country and abroad during the Association's organizational period. These include engineering survey studies, in progress at Southwest Research Institute and the Battelle Memorial Institute; a study aimed at development of a stainless copper, in progress at Battelle; and an investigation on organic and inorganic coatings for copper-bearing metals, recently begun at the British Non-Ferrous Metals Research Association, London, England. In cooperation with the technical and marketing committees of the CPDA, he will be responsible for the establishment of additional studies designed to develop new uses and markets for copper.

♦

CORROSION SUBJECT OF SPE REGIONAL MEETING

"Plastics vs. Corrosion" will be the theme of a Society of Plastics Engineers Regional Technical Conference to be held in San Francisco on October 5 at the Mark Hopkins Hotel. Sponsored by the Golden Gate Section of the SPE, the one-day technical meeting is under the general chairmanship of Dr. J. W. Richardson of Rohm & Haas Co., San Francisco.

Objective of the conference is to broaden the knowledge of those engaged in combatting corrosion by introducing and increasing the use of plastics. Many structures, valves, piping systems, tanks and coatings are constantly being destroyed by corrosive action of salt water, acids and other agents, amounting to multi-million-dollar losses annually. Speakers at the conference will indicate low-cost and efficient methods to cut down maintenance and replacement costs by use of the plastics materials.

The Conference will be supplemented on October 6 and 7 by a regional meeting of the National Association of Corrosion Engineers in the same city at the Sheraton-Palace Hotel. The three consecutive days of corrosion problems are expected to attract representatives of a wide variety of Bay Area industries.

♦

AUTOMATION AND METAL WORKING AT ASTME SHOW

Seventy-five per cent of the space in the Los Angeles Memorial Sports Arena has been assigned for the ASTME Western Engineering Conference and Exhibit, Nov. 14 to 18.

More than 12,000 industrial executives, production men, and engineers are expected from eleven western states to see 2000 of the latest items in automation and metal working equipment—worth over $5,000,000.

Concurrent with the tool show will be a series of technical sessions held at the Ambassador Hotel in Los Angeles. Other events planned include plant tours to local industries, guest speakers of national reputation, and a varied program for ladies accompanying their husbands.

♦

NEW TECHNICAL ASSOCIATION FORMED IN FRANCE

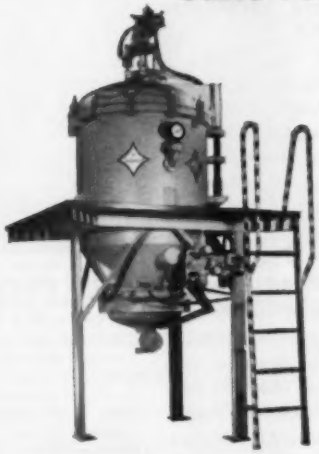
On March 19 of this year, a new technical association was founded in France called Association des Ingenieurs et Techniciens de l'Electrolyse (AITE) or in English, Association of Electrolysis Engineers and Technicians. The new association is headquartered at 8 Rue Jean Goujon, Paris 8e. M. Dufils is its first president.

The purpose of the association is set forth in its statutes, wherein it states that the "Association aims . . . to bring together electrolysis engineers and technicians, to inform them by means of bulletins, library, conferences, visits, etc. of all that can help them in their technical knowledge and their relations, between themselves and the Members of the Association."

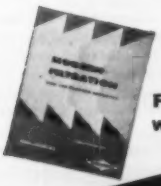
At the end of July, the association had 100 members, four of them honorary, and it was in communication with more than 700 engineers and technicians.

SAVE TIME and EFFORT WITH MODERN FILTERS

Just flip the lid
...WHAM...
cake removed



These rapid cleaning devices on INDUSTRIAL filters offer tremendous advantages to the user through removal of, and subsequent disposing of waste materials or recovery of valuable solids.



For additional information write for Bulletin EP-100.

With VIBRA-SHOC or RECIPRO-SHOC, cleaning of your INDUSTRIAL filter is completed in minutes. The above mentioned trade named devices are obtainable on INDUSTRIAL'S TYPE 152 filters, as are such optional equipment as QUICK OPENING COVERS, LIQUID SHOC and AIR WASH, all designed with the efficiency you require for your particular operation. All these mechanical aids work for you to realize a definite cost savings based on reduced downtime, for either continuous or batch type operation. These self-cleaning devices also eliminate the manual dirty work in handling any dry, wet or semi-solid material.

INDUSTRIAL

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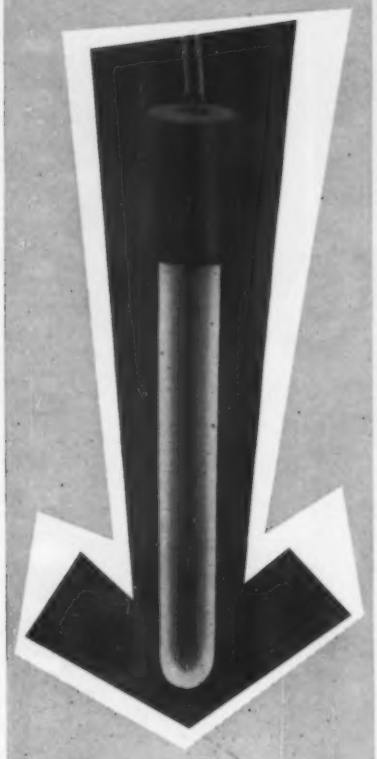

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Robert L. Giesel, left, receives gavel on his election to NAMF presidency from outgoing president, A. T. Leonard.

GIESEL ELECTED TO HEAD NAMF

Robert L. Giesel, president of Adolph Plating, Inc., Chicago, was elected president of the National Association of Metal Finishers on July 22 at Los Angeles, during the association's annual meeting. He succeeds A. T. Leonard, of Superior Plating, Inc., Minneapolis, Minn.

Other officers elected at the NAMF's annual meeting: Edward N. Marlette, Marlette Plating Co., Buffalo, N. Y., first vice president; James E. Cogan Jr., Globe Electro-Plating Co., Philadelphia, Pa., second vice president; Frank Kaiser, Long Island Mechanical Plating Co., Woodside, L. I., N. Y., secretary-treasurer; and Sal Novelli, Service Plating Co., Brooklyn, N. Y., assistant secretary-treasurer. A. T. Leonard (Superior Plating, Inc., Minneapolis, Minn.), continues on the executive committee as the immediate past president.

In addition to the officers who comprise the executive committee of the board of directors, the following directors were elected at the Los Angeles conclave: Harold E. Coombes Jr., Crown City Plating Co., El Monte, Cal.; William C. Crawford, Chrome-Rite Co., Chicago, Ill.; Glenn H. Friedt Jr., United Platers, Inc., Detroit, Mich.; John T. Hyduke, Durable Plating Co., Cleveland, O.; Arthur W. Logozzo, Nutmeg Chrome Corp., West Hartford, Conn.; Henry J. Siegel, Siegel-Robert Plating Co., St. Louis, Mo.; George W. Taylor, Production Plating Co., Adel, Ga.; and Curtis M. Varland, Varland Metal Service, Inc., Cincinnati, O.

ANNUAL PARIS CONFERENCE ON HARD CHROMIUM PLATING

The annual Conference on Hard Chromium Plating was held on May 13, 1960 at the Maison de la Chimie (Centre Marcelin Berthelot), Paris, France, with many delegates attending the presentation of the various papers and participating in the ensuing discussions.

Four papers were presented at the Conference and the abstracts follow:

Preliminary Surface Treatment of Light Metals Prior to Chromium Plating, by Dr. P. Csokan, Non-Ferrous Metal Research Institute, Budapest.

The author made an historic survey of the various processes used for depositing hard chromium on aluminum and aluminum alloys, and commented on resulting developments in the plating technique and adhesion of the chromium deposit.

The author's investigation involved in the first place an analysis of the chemical composition of the light metals, which had previously undergone the various treatments studied; three types of base metals were used, i.e., pure aluminum, an aluminum-magnesium-silicon alloy (AS13) and an aluminum-copper-magnesium alloy (AU4G).

Having chosen eight preliminary surface treatments for the three base metals, the author discussed the phenomena observed in the initial phase of chromium plating, lasting about ten minutes. Observation of a series of photographs made it possible to determine the surface treatment best suited for each particular type of light alloy. In the case of aluminum-silicon and aluminum-magnesium-silicon alloys subjected to friction and slipping stresses the author recommended direct chromium plating following surface treatment by a mixture of nitric and hydrofluoric acids.

Current-Distribution Improving Aids, by Dr. Robert H. Rousselot, Electrolysis Laboratory, French National Center for Scientific Research.

Due to the lack of previous work on the subject, the author starts from the very beginning, and his approach is at present limited to an elementary study, in the mathematical sense, of current-distribution improving aids.

Limiting himself to a two-dimensional system and a plane cathode symmetrically placed in a rectangular vessel, the author studies the effects, on the current distribution along the cathode, of plane improving aids placed in a simple position (parallel or perpendicular to the cathode).

The improving aids consist of: (a) non-connected aids, i.e. screens, conducting shells and bipolar conductors; and (b) connected aids, i.e. auxiliary anodes and robbers (auxiliary cathodes).

The results of measurements for over 90 current distributions are presented in terms of imax/imin ratio, with several typical C.D. curves and field plots.

In his conclusions, the author points out that this introductory study, the results of which can already be used in practical applications (patent), will be followed by a more comprehensive one on "sources" and "sinks," which ought to open a new era in the current distribution improving technique.

Some Special Applications of Hard Chromium, by Mr. L. De Vaulchier, Ingenieur ECP.

The author first made a study of the adhesion of hard chromium deposits. Particular phenomena, which remain largely unexplained, are observed at the interface between two cristalline networks when one of them is of electrolytic formation. There is a

relationship between this phenomena and adhesion. It is therefore difficult to give a definition for adhesion. The author presented photographs showing interfaces and diffusion zones in a number of specific cases: nickel on uranium, chromium on titanium. Preliminary electrolytic surface treatments such as degreasing and de-oxidation have particular effects on the structure of the base metal and on the cathode layer at the time of electrolytic deposition. The author discussed the case of cast iron and recalled the effects produced by hydrogen.

The author then presented a series of special applications and gave his comments on a great number of photographs which he produced: hard chromium plating of certain special alloys (beryllium-bronze forms, brake-drums made of AU8 aluminum alloy, shuttle-guides made of AU5GT aluminum alloy)—Applications of hard chromium plating in hydraulic engineering (tread circles, jackets, labyrinths and shielding plates of Francis turbines; Pelton wheels)—Hard chromium plating of gun bores: importance of the machining and finishing process of the steel base prior to plating.

The author concluded by recalling that chromium plating is one of the steps within a range of operations reaching as far back as the production and shaping of the base metal, and leading up to mechanical and thermal treatments following deposition of the coating.

Non-destructive Thickness Measurements of Hard Chromium Deposits Using Magnetic and Electric Methods, by P. Morisset, Ancien Elève de l'Ecole Polytechnique, Director of the Centre d'Information du Chrome Dur.

Conventional methods based on magnetic attraction and magnetic flux variations are suitable for measuring the thickness of hard chromium deposits on steel or cast iron. Methods making use of eddy currents and based on the difference in electrical conductivities between the base metal and the coating can be applied to hard chromium deposits on aluminum and its alloys. The author compared this method with the one based on magnetic attraction for the measurement of chromium thickness on steel. He exemplified some practical applications of these methods in specific problems such as measurements inside bores. He then explained the principle of the methods making use of X-ray fluorescence, describing a number of applications such as the measurement of chromium thickness on aluminum or molybdenum. It is a requirement of these methods that the respective atomic numbers of the base metal and coating be substantially different. A method developed recently makes use of the emission of X-rays by the base metal through the coating; this permits measurement of the chromium thickness on any type of base metal.

In conclusion the author pointed out that it is desirable, prior to the application of the conventional magnetic methods, to calibrate the instruments with the use of standard gauges; he also stressed the advantages which would be obtained from a standardization of measuring methods.

This paper was illustrated by demonstrations of measurements of hard chromium thickness using various measuring instruments.

HESS NAMED ASTM ACTING EXECUTIVE SECRETARY

The Board of Directors of the American Society for Testing Materials has announced changes in the responsibilities of headquarters staff members, affecting particularly the office of executive secretary. Raymond E. Hess, associate executive secretary, has been named acting executive secretary, and Robert J. Painter, executive secretary since 1952, is to be consultant to the executive secretary. He will continue as treasurer of ASTM, and will give concentrated attention to long-range planning work.

Mr. Hess, who will continue his responsibilities as technical secretary and editor-in-chief, was for many years assistant secretary, becoming associate executive secretary in 1952. He has been with ASTM since 1920.

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PATENT ABSTRACTS

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2,918,388, 12/22/59—COATING METALS—G. Moller, assignor to American Mollerizing Corp., Beverly Hills, Calif.

A method and means for aluminum hot-dipping is claimed wherein the base metal strip is drawn through a halide flux (1000–1650F), then directly into the molten aluminum.

10 claims, figure.

2,918,390, 12/22/59—CORROSION INHIBITION—L. Brown and S. Spring, assignors to Pennsalt Chemicals Corp., Pennsylvania.

To prevent "white" rust on galvanized stock, alkaline clean cathodically, rinse, apply a solution of a fatty amine salt, followed by a (0.05–0.5 per cent) solution of a hexavelent chromium compound.

12 claims.

2,918,414, 12/22/59—ANTIMONY PLATING—G. Schaer, assignor to Bradley Mining Co., San Francisco, Calif.

To prepare a steel object to receive an antimony electroplate, treat said steel anodically in sulfuric, phosphoric or hydrochloric acids at a current density of at least 75 asf to passivate.

See also 2,918,415 by same patentee describing an antimony plating process wherein the steel is first plated with iron followed by the electrodeposition of antimony from a citrate bath with 1 claim.

6 claims.

2,918,416, 12/22/59—ANODIZING ALUMINUM—Paul Taylor, Gardena, Calif.

Aluminum may be anodized in a sulfuric, chromic, phosphoric or oxalic acid bath or mixture thereof, the improvement being the addition of mellitic acid.

15 claims.

2,918,417, 12/22/59—BORON—H. Cooper and J. Schaefer, assignors to W. Weil, Shaker Heights, Ohio.

A fused salt electrolysis method for making boron is disclosed.

10 claims.

2,919,233, 12/29/59—AMPHOTERIC METAL ELECTROPLATING PROCESS—George Cox, Carleston, W. Va.

Coat a structure with a Pb, Zn or Sn, a firmly coating complex of low solubility, then make said structure the cathode in a soluble alkali metal electrolyte to deposit the metal.

6 claims.

2,920,001, 1/5/60—JET SPRAYING APPARATUS—G. Smith and R. Kaffenberger, assignors to Union Carbide Corp., New York.

An apparatus for propelling solid material at above 2000 feet per second by means of a jet flame onto a surface.

13 claims, figure.

2,920,002, 1/5/60—MANUFACTURE OF THIN FILMS—M. Auwarter, Balzers, Liechtenstein.

A gas plating method for laying thin films on a substrate is described. Convention application date 6/25/52.

12 claims.

2,920,018, 1/5/60—ANODIZING PROCESS—M. Miller, assignor to Electro-Chem Mfg. Co., Inc., Los Angeles, Calif.

The use of pulsed d-c current is claimed with the zero current period being three times the duration of the current pulse.

5 claims.

2,920,019, 1/5/60—BLACK PLATE TREATMENT—E. and R. Smith, assignors to National Steel Corp., Delaware.

The method consists of anodically treating the black plate in an aqueous, acidic phosphate bath (dehydrogen phosphate in the amount of 1–15 oz/gal).

23 claims.

2,920,023, 1/5/60—ELECTROLYTIC CLEANING OF METAL—C. D'Aquila and R. Bohne, Jr., assignors to Chrysler Corp., Highland Park, Mich.

A molten, electrolytic ferrous treatment bath is described as a caustic alkali, 97 parts, and an alkali fluoborate salt, about 3 parts.

23 claims.

2,920,026, 1/5/60—GRINDING WHEEL—S. Kistler, assignor to the Norton Company, Worcester, Mass.

An electrically conductive grinding wheel is described which removes material by electrolytic action.

8 claims, figure.

2,920,385, 1/12/60—BONDING CARBON TO ALUMINUM—R. Fike and A. Pilous, assignors to Borg-Warner Corporation, Chicago, Ill.

To join an aluminum member to a carbon member providing at least one member with a layer of tin, bring together and heat to the melting point of the tin.

16 claims, figure.

2,920,428, 1/12/60—BUFF—E. Hall and A. Rock, assignors to F. L. Codman Co., Rockland, Mass.

A type of finger buff is described.

6 claims, figure.

2,920,988, 1/12/60—QUENCHING PROCESS—T. Bulat, assignor to Bendix Aviation Corp., Davenport, Iowa.

The use of ultrasonic energy during the removal of steel objects from a quenching bath to reduce liquid loss is described.

1 claim.

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CHROMIUM

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Decorative chromium plating is usually a thin electrodeposit approximately .00002" thick. As such a plate will show any marks on the metal beneath it, the surface prior to chrome plating should be pre-finished to meet the requirements of the particular article.

If the final finish is to be a high color*, it should be produced on the metal beneath the chrome plate; or if a satin* chrome is required, a satin finish should be produced on the metal beneath, before chrome plating.

*Consult your files or write to us for previously issued Abrasive Finishing Data Sheets for Specific Base Metals to be Buffed or Polished in order to select the proper Lea Abrasive Compositions.

When decorative chrome plating is done properly, little or no buffing is done on the chrome surface. If the work leaves the chrome tank with a slight fog marring the bright deposit, this can be removed by **color buffing with Grade 304-B Learok** on **a loose muslin buff at about 7000 sfm.** If the articles leave the chrome tank showing burned areas, these sections can be **cut and color buffed** to the lustre required with **Grade 305-A Learok** on **a loose muslin buff rotated at approximately 8000 sfm.**

When the final requirement for the chrome plate is a **satin finish,** previous intermediate copper and nickel deposits must be satin finished, prior to chromium plating. If a heavy hard nickel plate from a bright nickel solution is used, **Grade "C" Lea Compound** is used on **a loose muslin buff rotated at 4500 sfm.** If the nickel deposit is thin or soft, **Grade "F" or "R" Lea Compound** should be used on **a soft packed muslin buff rotated at about 4000 sfm.** In both cases the direction of satin finishing on nickel plate should be in the same direction as the satin finishing operation on the base metal or intermediate copper plate.

Decorative chrome plate is then deposited on top of the satin nickel plate. If done properly further finishing is not required.

If the chromium plate comes out foggy or milky, a light satin finishing operation is done with **Grade "FG" Lea Compound** on **a soft, packed muslin buff rotated at approximately 3000 sfm,** and in the same direction as on the previous intermediate deposits.

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Note: The above Lea-Ronal Cyanide Copper Processes are covered by patents or pending patents.

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2,921,008, 1/12/60—CONVEYOR—A. Hauck, Bound Brook, and Paul Hauck, Union, N. J.

A processing conveyor is described.

16 claims, figure

2,921,009, 1/12/60—PLATING APPARATUS—C. Jenks and J. Niles, assignors to The Stutz Company, Chicago, Ill.

A plating barrel is described.

5 claims, figure.

2,921,865, 1/19/60—COLD EXTRUSION LUBRICANT—W. Kubie, assignor to Aluminum Research Corp., Delaware.

Lay down a zinc phosphate coating on a billet, then place in an aqueous lubricating bath of free stearic zcid to convert the zinc phosphate to a zinc stearate.

See also 2,921,874 by same inventor describing a cold forming lubricant for billets with 9 claims.

2 claims.

2,921,877, 1/19/60—CHROMIZING—G. Samuel, assignor to David Craven, Wilmington, Del.

A method of chromizing tool steels using metallic chromium and a halogen chromizing catalyst.

3 claims, figure.

2,921,888, 1/19/60—ELECTROPLATING TITANIUM—D. Halpert, assignor to Vertol Aircraft Corp., Morton, Pa.

Claim 2 reads: "The process of electrodepositing metal selected from the group consisting of nickel, cobalt and alloys of nickel and cobalt on titanium and titanium base alloy members which consists of immersing the titanium member in a solution of hydrofluoric acid for a time sufficient to form a violet film, rinsing said titanium member in water and then immersing the member in an aqueous electrolyte consisting of at least one sulfate salt selected from the group consisting of nickel sulfate and cobalt sulfate, the nickel sulfate in an amount corresponding to from 70 to 375 grams of nickel sulfate ($NiSO_4 . 6H_2O$) per liter of solution, the cobalt sulfate in an amount corresponding to from 70 to 375 grams of cobalt sulfate ($CoSO_4 . 7H_2O$) per liter of solution, and sulfuric acid in quantity sufficient to adjust the solution *p*H value from about 0 to 6.2, said bath being substantially free of metal salts of halogen acids, and then passing a plating current through the member at a current density of 5 to 100 asf, thereby depositing on the titanium member a metal coating which remains firmly adherent at a temperature of 1000F."

2 claims.

2,921,968, 1/19/60—GAS PLATING—C. Berger, assignor to Union Carbide Corporation, New York.

Place articles to be plated with aluminum in an enclosure, evacuate, and draw in an inert gas pre-washed with a liquid hydrocarbon then introduce a thermo-decomposable organo aluminum compound.

3 claims.

2,922,262, 1/26/60—BUFFING APPARATUS—D. Atkins, assignor to American Buff Co., Chicago, Ill.

A hub for mounting a plurality of buffing sections is described.

11 claims, figure.

2,927,043, 3/1/60—ALUMINUM COATING PROCESS—A. Stetson, assignor to Solar Aircraft Co., California.

Coating an article is described as based upon aluminum in particle form and a water-soluble flux in an organic vehicle being placed on the surface followed by heating to melt the flux, then the flux is leached out. The flux consists of 70–88 per cent of K and Na chlorides, 30–12 per cent of lithium fluoride, cryolite and aluminum fluoride.

41 claims.

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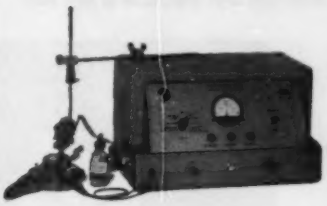

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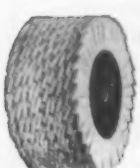

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2,927,046, 3/1/60—SOLUTION FOR COATING METALS—D. Andrade, assignor to Parker Rust Proof Co., Detroit, Michigan.

A composition is described as consisting of tertiary butyl alcohol containing 1 per cent and saturation of chromic acid.

8 claims.

2,927,049, 3/1/60—FLUXING COMPOSITION—R. D. Wasserman, Stamford, Conn., and J. Quaas, Island Park, N. Y., assignors to Eutectic Welding Alloys Corp., Flushing, N. Y.

A brazing flux consisting of a boron ester and water with a little inhibiting mineral oil is described.

13 claims.

2,927,066, 3/1/60—CHROMIUM ALLOY PLATING—Glenn Schaer, assignor to U.S.A. (Army).

A chromium-iron alloy deposit can be obtained from an aqueous bath consisting essentially of 20 to 75 g/l of Cr^{+++} ions, 10 to 150 g/l of alkali metal or ammonium ions, 0.6 to 2.5 g/l of Fe^{++} and 8 to 65 g/l of sulfamate ions.

11 claims.

2,927,871, 3/8/60—CONTROL OF PICKLING BATHS—E. Manche and C. Shingledecker, assignors to Bethlehem Steel Co., Bethlehem, Pa.

A conductivity control and automatic measuring device for adding sulfuric acid to pickling baths is described.

7 claims, figure.

2,927,872, 3/8/60—DYEING ANODIC COATINGS—C. Cohn, assignor to Colonial Alloys, Philadelphia, Pa.

To dye anodized aluminum coatings, immerse said coatings in an aqueous solution containing at least 0.04 g/l of a hydrolyzable salt of a weak metallic base and an anthraquinone dye and seal in a solution containing at least 0.04 g/l of hydrolyzable salt of a weak metallic base.

7 claims.

2,927,873, 3/8/60—INCREASING CORROSION RESISTANCE—E. Bengtason and Obson, assignors to Aktiebolsgt Bofors, Bofors, Sweden.

Acid proof steel can be made more corrosion resistant by subjecting to a solution of 33 per cent nitric acid and some phosphate at 185C and a pressure of 40 kg/cm².

4 claims.

2,927,874, 3/8/60—PROCESS FOR PRODUCING ALUMINUM COATINGS—G. Pimbley, assignor to Turco Products, Inc., Los Angeles, Calif.

First deposit a chromate conversion coating, then decolorize by use of a 2 per cent solution of an agent which will react chemically with the hexavalent chromium to discharge the color.

19 claims.

2,927,011, 3/1/60—ETCHING—R. Stead, assignor to Texas Instruments, Dallas, Texas.

An etching solution for the surface of an electrical semiconductor contains 30 parts of concentrated nitric acid, 20 parts of 48 per cent hydrofluoric acid and 40 to 80 parts of glacial acetic acid and one part by volume of aniline.

9 claims.

2,928,168, 3/15/60—IRON COATED URANIUM—A. Gray, assignor to U.S.A. (A.E.C.).

A metallic uranium article is described as having an adherent coating of iron followed by an adherent aluminum coating.

12 claims, figure.

2,928,169, 3/15/60—PLATING MOLYBDENUM—J. Beach and G. Schaer, assignors to U.S.A. (Navy).

Claim 1 states: "An article composed of molybdenum, a strike coating of chromium plated thereon, a layer of gold plated on said strike coating of chromium, and a substantially thicker layer of chromium plated on said gold.

6 claims, figures.

2,928,757, 3/15/60—CHEMICAL NICKEL PLATING—W. Lee and E. Brower, assignors to General American Transportation Corp., Chicago, Illinois.

Titanium, zirconium and hafnium can be electroless nickel plated after cleaning in the normal fashion and pickling in a HF-HCl bath containing a mild oxidizing agent. The work is finally heated to 425C to cause a diffusion between the base and the nickel deposit.

9 claims, figure.

2,928,762, 3/15/60—PHOSPHATE COATING—M. Hyams, assignor to Neilson Chemical Co., Detroit, Michigan.

The process is described as treating a ferrous surface with an acidic phosphate coating, followed by a non-oxidizing rinse at *p*H of 4.5 or less, and a final acidic rinse in a solution containing chromate ions.

9 claims.

2,928,763, 3/15/60—ALUMINUM CHROMATING PROCESS—W. Russell of Royal Oak and James Van Vliet of Detroit, Michigan.

A bath for chromating aluminum consists essentially of 5 to 150 g/l of phosphate ion, 2.5 to 62 g/l of CrO_3, 1 to 55 g/l of Al^{+++} and 2.5 to 123 g/l of fluoride ion. The bath is operated at a *p*H of 0.8 to 1.5.

16 claims.

2,928,402, 3/15/60—ELECTROPROCESSING APPARATUS—V. Finston and W. Kostner, assignors to The Meaker Company, Chicago, Illinois.

An electroplating conveyor is described.

See also 2,929,519 describing a work transfer device, 2,928,519 and 2,928,401 describing a conveyor, by V. Finston and assigned to The Meaker Company with 4 claims.

26 claims, figure.

2,928,776, 3/15/60—COATING ANODIZED COPPER WIRE—H. Puppolo, assignor to Sprague Electric Co., North Adams, Massachusetts.

A method is described for coating copper wire, including an anodizing step for the copper.

2 claims.

2,928,777, 3/15/60—ELECTROPOLISHING—G. Smith, assignor to Electro Process Co., Buffalo, New York.

An electropolishing bath for metals is described as containing 1.0 to 50 per cent of an aromatic hydrocarbon sulfonic acid and 50 to 70 per cent of orthophosphoric acid.

8 claims.

2,928,889, 3/15/60—ELECTROLYTIC CELL—H. Linford and F. Bonner, assignors to Koehler Mfg. Co., Marlboro, Mass.

A hermetically sealed nickel-cadmium galvanic cell is described.

3 claims, figure.

2,929,739, 3/22/60—ALUMINUM PLATING—E. Breining et al., assignors to Union Carbide Corp., New York.

An improvement in plating aluminum onto a substrate which consists of mixing with a heat decomposable aluminum compound which tends to form hydrides with an unsaturated compound capable of reacting with such hydrides.

15 claims, figure.

(Continued on page 1086)

HOW THE BAIRD SELECTED DISTRIBUTOR MARKETING PLAN PROTECTS BARREL FINISHING EQUIPMENT USERS

WHAT IS THE MARKETING PLAN ALL ABOUT?

It is a nationwide effort on the part of Baird to establish a limited number of strategically located key sources for its barrel finishing equipment. These key sources are independent distributors carefully selected and both appropriately staffed and stocked to fill all possible customer needs . . . from problem-solving test processing of samples to machine service.

WHAT IS A SELECTED DISTRIBUTOR?

A Selected Distributor is that sales and service organization with a proven record of success in serving the metal finishing field. It is a company which has met all the stringent requirements of the Baird Marketing Plan . . . operation on an exclusive basis . . . the display of Baird equipment . . . the full-time employment of barrel finishing experts . . . the ability to meet any requirement for abrasives, media or compounds, from stock.

HOW DOES BUYING FROM A BAIRD SELECTED DISTRIBUTOR PROTECT ME?

Quite simply, it assures you the most complete single, reliable source for your every barrel finishing equipment or supply need. You deal always with a highly regarded, reputable organization capable of offering attractive price, excellent delivery and first-rate service.

THE BEST IN BARREL FINISHING EQUIPMENT AND SUPPLIES COMES FROM YOUR BAIRD SELECTED DISTRIBUTOR

Write for the name of your Baird selected distributor in your area.

BAIRD THE BAIRD MACHINE CO.
Barrel Finishing Equipment Division
500 STRATFORD AVE. • STRATFORD, CONN.

INDUSTRY NEWS

PALUMBO BREAKS GROUND FOR NEW DIVISION

Ground has been broken in Linden, New Jersey, for the erection of a specially designed building to house the new electronics division formed by Palumbo Bros., Inc., whose electroplating facilities have been established in Newark, N. J., since 1915. To be known as Platronics, the new division will reportedly specialize in specification electroplating of electronic components with all the precious, as well as base metals.

According to John Palumbo, secretary and general manager, the building will encompass over 20,000 sq ft of custom-made equipment to provide the close tolerance plating.

Officers of the new corporation are: A. J. Palumbo, president; A. F. Palumbo, vice president; A. C. Palumbo, treasurer; and John Palumbo, secretary and general manager. Platronics will be temporarily situated at 347 Ferry Street, Newark, N. J., until the new facility is completed sometime in the early fall.

♦

DU PONT CONSOLIDATES ELECTROPLATING PRODUCTS BUSINESS

Realignment of the Du Pont Company's formaldehyde and electroplating products business to consolidate the research, production, and sales of each into a single department has been announced by the company. At present, two operating departments are engaged in each of those lines. The consolidation, effective September 1, will provide greater flexibility in each operation.

The formaldehyde and formaldehyde derivatives business now conducted by the electrochemicals department will be transferred to the industrial and biochemicals department. The latter is already a large producer of formaldehyde and also manufactures methanol, the raw material for formaldehyde. Both are large volume commodities.

The electroplating products business now conducted by the industrial and biochemicals department will be transferred to the electrochemicals department. These are specialty items currently marketed solely by the latter which also has the company's major manufacturing facilities in that line.

♦

TITANIUM PRODUCTS NAMES WESTERN REPRESENTATIVE

Titanium Products Corporation has announced the appointment of Astroloy, Inc., 1405 Marcelina Avenue, Torrance, California, as district representatives for all Titanium Mill products and anodizing and Plating specialties, serving the 11 Western States.

♦

FREDERICK GUMM LICENSES CANADIAN MANUFACTURER

To provide better service to Canadian customers, and to obtain more complete coverage, Frederick Gumm Chemical Company of Kearny, N. J., has licensed Snap Manufacturing Ltd. to manufacture and sell their complete line of Clepo compounds for the metal finishing industry in the Dominion of Canada.

Snap Manufacturing Ltd., with manufacturing and shipping facilities at 9680 St. Lawrence Blvd., Montreal, Quebec, in addition to their warehouse at 2453 Yonge Street, Toronto, Ontario, have been producing cleaners and maintenance materials for domestic and industrial use for over 50 years.

♦

NEW CHEMICAL DISTRICTS FOR McKESSON & ROBBINS

The chemical department of McKesson & Robbins has established five new chemical districts in the South Central States.

McKesson's former Southwest Central District comprising fourteen branches has been reorganized into the Corpus Christi, Dallas, Houston, Kansas City and New Orleans Districts. The new district managers are, respectively, Robert W. Laws, Walter R. Petersen, Harrison Hale, Jamie C. Beard and Warren L. Schulz.

Walter M. Betts, vice president and formerly manager of the Southwest District, is now assigned to McKesson's Chemical Department Home Office for staff work on departmental projects. Mr. Betts will maintain an office at the Company's Kansas City Chemical Department operation.

♦

NEW CHEMICAL PLANT FOR PENNSALT

Production and distribution of a diversified line of chemical specialties products was begun by Pennsalt Chemicals Corporation at a new 34,000 sq-ft plant just completed in Atlanta, Georgia. The fourth modern blending, warehousing and distribution center designed and constructed by Pennsalt since 1955, the new plant will serve the Southeast with Pennsalt's full line of products for the metal processing and other major industries.

Metal producers and fabricators in the Southeast will be served by a line of phosphatizing, cleaning and drawing lubricants as well as Pennsalt's metal processing machinery and technical service through this new location under the district salesmanagership of Cooper Schley.

♦

DELAWARE BARREL HAS $1,000,000 EXPANSION PROGRAM

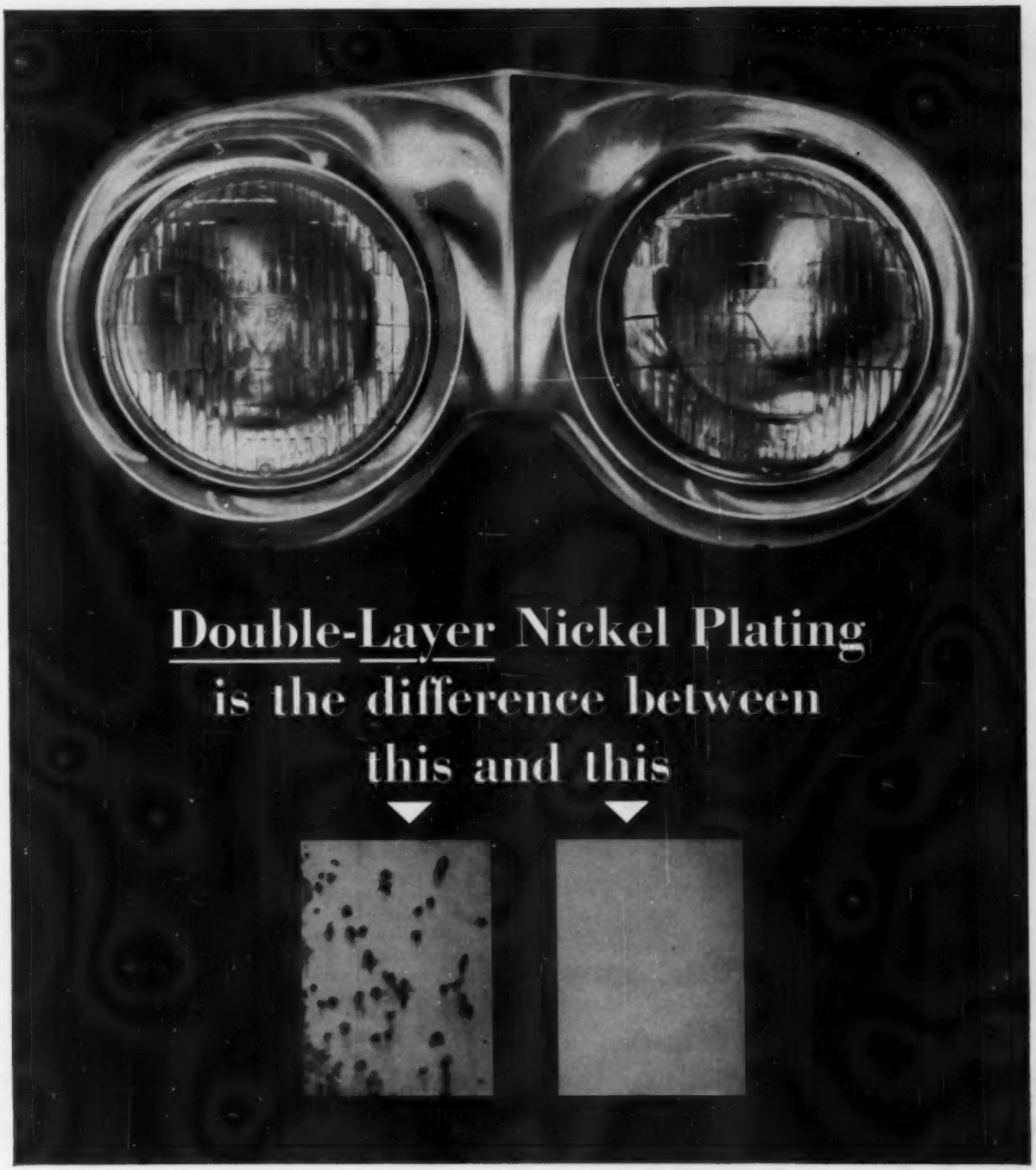
The Delaware Barrel & Drum Company of Wilmington, Delaware announced that it was entering into a $1,000,000 expansion program to be completed by June, 1961. Delaware Barrel has recently purchased the former plant of the Pullman Company in Wilmington, Delaware which consists of 215,000 square feet. An additional five acres of ground for future expansion was purchased.

♦

BAIRD REORGANIZES PRODUCT DISTRIBUTION

The adoption of a new marketing and distribution program which will reorganize its current dealer sales organization, has been announced by the Barrel Finishing Equipment Division of The Baird Machine, Co., Stratford, Conn.

The new plan calls for the appointment of a selected group of 21 major distributors to the metal finishing field in key marketing centers. These organizations will be designated as selected distributors and operate on a completely exclusive basis within their sales territories. In addition, selected distributors will stock barrel finishing equipment, perform test processing of samples, and have in their employ at least one thoroughly trained expert in tumbling operations.



Double-Layer Nickel Plating is the difference between this and this

Both of these plated panels were exposed in a corrosive marine atmosphere for 18 months!

You can see how the panel on the left — plated with a Nickel-Chromium coating that is perfectly suitable for less rugged use — fared in this severe outdoor test.

But the panel on the right — *coated to the same 2.0 mil thickness* — retained its rich original luster!

Why? *Double-Layer* Nickel Plating — a good thick layer of sulfur-free, semi-bright Nickel beneath the lustrous bright Nickel layer and the thin chromium overlay.

Remarkably durable, this combination provides outstanding resistance to corrosion, abrasion and wear . . . helps assure the mirror-bright, *lasting* eye appeal that satisfies today's quality-conscious customers.

For more information on the durability of decorative Nickel-Chromium plating, write for your free copy of "*The Contribution of Nickel and of Chromium to the Durability of Decorative Plating.*"

The International Nickel Company, Inc.
67 Wall Street New York 5, N.Y.

Inco Nickel

Nickel makes plating perform better longer

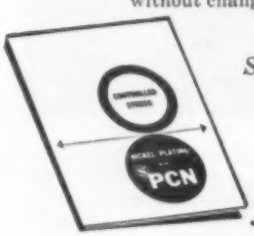
Looking for "hugging power" in Nickel Plating Baths?

SEYMOUR PCN®
Stress Reducing Agent
is YOUR ANSWER!

The average Watts solution . . . without any stress relieving agent . . . will deposit nickel having a tensile stress of 23,000 psi and a hardness of 150 VHN. The addition of Seymour PCN in proper amounts will convert this tensile stress to a compressive stress thus depositing a nickel which tends to hug the base metal. Further, the degree of compressive stress can be controlled through a range from zero to 8,000 psi! The hardness of the nickel deposit increases from 150 VHN to 600 VHN without any loss in the high ductility characteristic to all Seymour plating solutions.

Other PCN Characteristics:

- Nickel deposits of high chemical purity.
- Excellent grain structure and high ductility.
- Excellent corrosion resistance.
- Easy removal of PCN from bath, through carbon purification.
- No breakdown or formation of organic contamination.
- Operation in pH range of 2.0 to 5.0 without change of color in the deposit.



Send for your copy of this Technical Brochure on Seymour PCN

ELECTRO CHEMICAL SUPPLIES DIVISION
THE SEYMOUR MANUFACTURING Co.
5 FRANKLIN STREET • SEYMOUR, CONN.

INDUSTRY NEWS BRIEFS

SCIENTIFIC INSTRUMENT EXHIBIT IN CHICAGO

Chicago Apparatus Company will present its 2nd Annual Scientific Instrument Exhibit on September 22 and 23 at the Edgewater Beach Hotel in Chicago.

This exhibit was changed from the originally planned April date because of conflicting meetings.

A number of first showings are anticipated as several new developments have been made final since the spring meetings. Thirty-six exhibitors (original manufacturers) are expected, covering the field and including automatic analyzers, chemicals, balances, centrifuges, *p*H equipment, furnaces, heaters, microscopes, ovens, spectrophotometers etc.

♦

NORTON APPOINTS HAMPDEN CHEMICAL AS DISTRIBUTORS

Norton Company, abrasive products manufacturer of Worcester, Mass., has appointed Hampden Chemical and Equipment Company of Philadelphia, Pennsylvania, as a distributor for its abrasives for barrel-finishing.

♦

NEW LIST OF COMMERCIAL STANDARDS OBTAINABLE FREE

A new List of Commercial Standards revised to July 1, 1960 is now available, according to Commodity Standards Division, Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce.

The new index lists all Commercial Standards under 22 classifications including Chemicals, Electrical and Mechanical Equipment, Instruments and Tools, Plumbing Materials and Fixtures, Precious Metals and many others.

Commercial Standards are voluntary standards adopted by industry to establish nationally recognized quality requirements, including methods of testing, rating, or grading. They also provide a means for certifying and labeling products that comply. They are developed at the request of the industry concerned to form a common basis of understanding among producers, distributors, and users of the products, and to provide a basis for fair competition.

Also available is a pamphlet entitled "Commodity Standards, WHAT they are—HOW they are done—WHY they are used."

Single copies of the list and the pamphlet are available without charge upon request to the Commodity Standards Division, U. S. Department of Commerce, Washington 25, D. C. (DUdley 6-1506) Ask for Catalog No. 978, and Commodity Standards Pamphlet.

♦

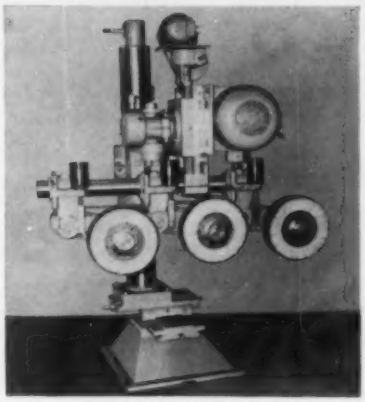
WYANDOTTE TO BUILD CANADIAN PLANT

Robert B. Semple, president of Wyandotte Chemicals Corporation, has announced plans to build a cleaning products plant in the Toronto, Canada, area. Construction, to begin late this year, will be on company property in Scarborough Township, 9 miles northeast of downtown Toronto. The plant will be served by the Canadian Pacific Railway and will have immediate access to By-Pass 401 highway.

Wyandotte will manufacture its complete line of J. B. Ford Division products at this Toronto plant, according to Ford Ballantyne Jr., a vice president, and general manager of the J. B. Ford Division.

Wyandotte's J. B. Ford Division products have been used by Canadian Business and Industry since 1920, when a sales office was first established. At present, Wyandotte sales and service representatives are located throughout Canada.

EQUIPMENT AND SUPPLIES



E—901. TRIPLE HEAD BUFFING LATHE—A new compact adjustable triple head buffing lathe that provides three buffing operations in a minimum amount of floor space is now available from Acme Manufacturing Co. This design permits the use of 3 buffing heads in a space normally required for 2 conventional single heads.

The buffing lathe is said to be uited for use with automatic high production straight line buffing machines where a large number of buffing heads are required for finishing parts such as: door knobs, plumbing fixtures, bumper guards, strip coils and a variety of automotive and building hardware, electrical fixtures and household appliances.

The adjustable lathe is equipped with floating heads operated by individual air cylinders to maintain uniform part buffing pressure.

The heads can be easily adjusted from a vertical to horizontal position. The three buffing heads can be individually set at separate speeds through a special pulley arrangement.

E—902. MIST BALLS—A new approach to low-cost fume and mist control in plating and pickling operations in the metals industry is found in the recent development and production of the Go-Mist Balls made by Cosom Engineering Corp. of Minneapolis, Minnesota.

Molded of super dylan high-density polyethylene, a product of the Plastics Division, Koppers Co., Inc., these precision made, hollow spheres offer an easy-to-use method for controlling undesirable fumes.

In plating operations it is claimed they show no deterioration at normal tank temperatures; in pickling operations laboratory tests show that the surface hardness of these balls is not affected after being in ten per cent aqueous solutions of hydrochloric and sulfuric acids at temperatures of 160 to 211F for three months.

It takes about 55 balls per square foot to adequately cover a tank surface, and a visual check is all that is needed to be sure of the right amount.

E—903. SELF-TUNING ULTRASONIC UNIT—A new method of ultrasonic cleaning said to increase efficiency by as much as 300 per cent over conventional ultrasonic systems is announced by Powerton Ultrasonics Corp.

For the first time in ultrasonic cleaning, consistent maximum efficiency and maintained optimum cleaning performance can be achieved through the use of Powerton's unique integral feedback transducer, which automatically adjusts phase and frequency for all conditions.

The new autosonic units are completely self tuning, and are claimed to eliminate the need for operator training and constant operator attention. Since the only control needed is a simple on-off switch, the Autosonic also does away with the risk of abuse by untrained operators.

The Autosonic's simple control method

PLATING MAGAZINE

OPPORTUNITY TO AUTHORS

Member or non-member authors of technical and scientific papers on electroplating, metal finishing and allied arts are cordially invited to submit manuscripts of original, unpublished papers to the Editor of PLATING MAGAZINE for review and publishing consideration.

Any such paper accepted and published in PLATING will also be eligible for selection by the Society's Paper Awards Committee for the Carl E. Heussner AES Gold Medal Award; AES Silver Medal; AES Bronze Medal; George B. Hogaboom Memorial Nickel Plating Award; Robert S. Leather Mechanical Finishing Award; Chromium Plating Award; Precious Metal Plating Award of AES, John J. Hanney Memorial Copper Plating Award or the Organic Finishing Award of AES.

So as to expedite review and other processing, please write the Editor, PLATING MAGAZINE, 443–445 Broad Street, Newark 2, New Jersey, for full particulars, including a copy of "Publishing Specifications for PLATING MAGAZINE Authors", before submitting your manuscript.

Deering, Milliken

RESEARCH
AND
CONTROL

From cotton...
to yarn...
to cloth...
to buff...

RESULTS IN SUPERIOR BUFF CLOTHS

What has

Fiber Fineness to do with

BUFF CLOTH PERFORMANCE ?

Contrary to common belief, cotton fibers can vary widely, depending upon country, soil conditions, rainfall, fertilizers, quality of seed ...and there is no certainty that one locale will produce the same quality cotton from year to year. That's why Milliken buyers not only field study each crop carefully as it is growing, but work with and advise farmers from seed to crop.

One characteristic of a fiber that bears heavily on the quality of buff cloth is the fineness of diameter of the cotton fiber. The finer the fiber the more resilient the yarn, the more flexible the cloth. The cotton that Milliken buys is carefully checked for fineness in one of the many divisions of the Milliken laboratory.

The practical result of this many-faceted care on the part of Milliken cotton experts shows up in the performance of buffs made of Milliken Cloth. One interesting case study of what one of the Milliken Cloths is doing in a certain plant (see opposite page) suggests that perhaps you, too, would benefit by testing buffs made of Milliken Cloth on your production line.

Have you read the Story of Deering, Milliken Research and its part in the development of the line of Milliken Buff Cloths? If not, let us know and we'll be glad to send you a copy. You will find it both interesting and informative.

ENGINEERED BUFF FABRICS by Milliken

REDLINE

WEARON

TYPE 190

TYPE 160

DEERING, MILLIKEN & CO., INC.

1045 SIXTH AVENUE • NEW YORK 18, N.Y.

1000 INDICATE A 937.

makes obsolete plate current and output meters, tune and load controls, and, in fact, practically all controls used in conventional ultrasonic cleaners. This makes it possible to situate generator and tank remotely without concern for tuning.

The feedback transducer measures the amount of ultrasonic activity—ultrasound waves—in the cleaning tank, and corrects output phase and frequency to maintain the standing wave condition. Consequently, maximum cavitation is maintained automatically for all conditions. Thus, heating or cooling, change of solvent, variation of product or material to be cleaned, or other changed conditions have no effect on the efficiency of the system.

E—904. TEST CABINET—A new cover balance mechanism and a redesigned control panel make Industrial Filter & Pump Mfg. Co.'s new corrosion test cabinet easier to use, say the manufacturers. Three specific improvements are cited: 1) Balanced cover tilts open or closed with minimum effort on internal coil springs with nylon bearings. Requires no maintenance or lubrication. 2) Cover spring hinges are heavy duty, integral with the cabinet, require no adjustment. 3) Front control panel is durable laminated plastic in contrasting colors to promote definition for pilot light indicators for cabinet and saturation tower heater operation. Print number designations clearly reference controls and switches for power and cabinet temperature.

E—905. DESCALER—A new safe, easy-to-use descaler, has been announced by Dearborn Chemical Co. Known as Scale-Cleen, the product is made with sulfamic acid and inhibitors that allow the acid to clean and dissolve scale without corroding or damaging metal. A built-in color indicator shows when the acid has been spent.

A dry crystalline material, Scale-Cleen cannot splash in handling. A spill is simply shoveled up. There are no irritating fumes, and the product is non-irritating to the skin.

E—906. ADDITION AGENT—The Seymour Manufacturing Co. has invented new improvements in making ductile copper platings. This product is marketed under the patented name of "CuSOL."

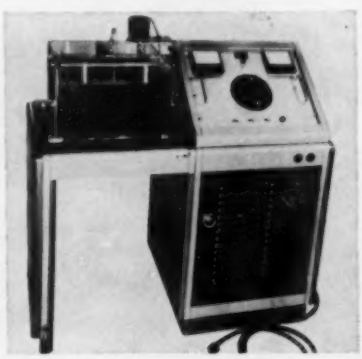
CuSol's objective is said not to produce bright copper deposits, but rather, to substantially increase the stability of the copper plate and to provide an essentially permanent plate which carries the qualities of ductility, smoothness and covering power to an exceptional degree. CuSol is claimed to be an electrodepositable solution of copper in which the additives are stable and free of break-down products.

E—907. CORROSION INHIBITOR—New Unicon acid corrosion inhibitor, additive for hydrochloric (muriatic) acid, permits any metal to be cleaned by the convenient acid immersion method, without the corrosive, surface eating action of untreated muriatic acid, including metals susceptible to acid corrosion.

E—908. pH PAPERS—Oxyphen Products Co. is now offering special *p*H papers for electroplating. They are provided to test a wide range of from *p*H 0.3 to 14.0, and are recommended for use for metallic baths of strong acid, and bright nickel, sodium chloride, ammoniacal and pyrophosphate copper solutions, also copper cyanide solutions.

E—909. DEBURRING MACHINE—The new Ferra-Burr, vibratory parts finishing machine is offered by Ultramatic Equipment Co.

The basic design of the tub itself and the positioning of the shaft housing contribute importantly to the production capacity of the Ferra-Burr machine. The finishing medium surrounds the parts at all times and the flow pattern of the medium induces pressure on the parts—pressure that is claimed to produce luster without deformation.



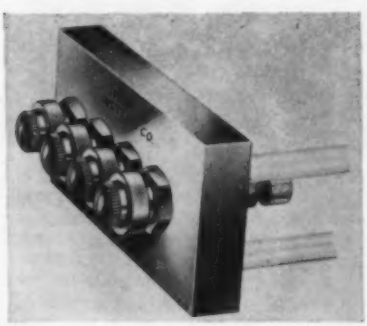
E—910. ELECTROLYTIC PROCESS UNIT—The Model 500 Allen-Dizor, just announced by Allen Aircraft Products is designed primarily for hard anodizing, the unit can also be used for sulfuric and chromic anodizing, straight electroplating,

chemical and electrochemical milling, electropolishing, electrolytic cleaning and etching.

Basic components of the Model 500 Allen-Dizor are (1) A chemical-resistant, crystal-clear lucite plating tank, equipped with anode and cathode racks, cooling coil, and agitator. (2) A 20-amp rectifier. (3) A ¼-ton refrigeration unit. (4) A desk-like console housing the rectifier and refrigeration unit and enclosing the rectifier control and the switches. Optional equipment includes an immersion heater.

Typical uses include hard anodizing of aluminum molds, dies, or wear plates, salvaging machine or production parts with hard chromium plate or hard anodizing, and restoring the lustre of old jewelry.

E—911. PNEUMATIC ATOMIZING NOZZLES—Spraying Systems Co. has announced a service of manufacturing pneumatic atomizing nozzle assemblies to customers' specifications to provide special design characteristics in terms of nozzle positioning, spray projection, mounting and control. To produce this type of unit, either standard or special fluid and air nozzles are employed and mounted to specially built body assemblies. The need for special nozzles of this type is usually the result of space limitations in the mounting location or area. A typical



example is shown in the illustration, where four nozzles had to be mounted in an opening that was extremely narrow. The answer here was to mount all four nozzles on a special body manifold that incorporated a common air and liquid inlet, with each nozzle individually controllable with a separate shut-off needle. Special Pneumatic Atomizing Nozzle assemblies of this type can be designed to meet almost any requirement with a choice of round, wide angle round and flat sprays in a wide range of spray angles and capacities.

E—912. MECHANICAL PLATER—A new method of plating metal parts for corrosion protection, complete with the necessary materials, has been announced by Minnesota Mining and Manufacturing Co. (3M), St. Paul, Minn.

It is said to eliminate hydrogen embrittlement as a problem in plating high-strength steel. A comparatively low capital investment is required, and the system can be operated at low cost.

The new method, called the Mechanical Plating System, is primarily designed for applying protective metal coatings. The 3M company has adopted the tradename "Dyko" for the metal coating applied under license by its system.

Thickness of plate is controlled by the quantity of metal powder added to the tumbling barrel, 3M points out, and thicker-than-normal coatings can be obtained with the same equipment and in approximately the same time by merely adding more plating metal. Present commercial installations are applying zinc coatings, and the method is under test for extension to cadmium and other metals. Another feature of the method is its ability to apply alloy coatings as simply as pure metals.

Emphasis was placed on the ability of the method to mass-plate small metal parts and assemblies, some of which could not be successfully plated by other methods because of design factors. It is not necessary to bake parts after plating.

E—913. ANTI-STATIC SOLUTION—Lea Manufacturing Co.'s Lint-Off No. 7527 is a new solution which when applied to plastic surfaces neutralizes static charge build-up. This static charge build-up is a common cause of lint and dust accumulation during buffing and polishing operations on plastic parts.

Lea Lint-Off may be applied by hand wiping or by direct transfer from a soft wipe-off buffing wheel. The product contains no solvents which will harm either thermoplastic or thermosetting plastic materials.

E—914. TANK LINING SHEET—Extruded Penton sheet in 48-in. wide rolls is now available announces National Vulcanized Fibre Co. Formerly, Penton sheet for corrosion-resistant linings was only commercially available in narrow widths.

These extra-wide rolls cut application costs because more surface area can be covered with a single width. This reduces the number of seams and seaming material required, cuts welding time and expense, and speeds installation.

Penton linings are applied both to existing equipment in the field and to new equipment during fabrication. Typical applications include linings for plating tanks, process vessels, fume hoods and ducts, large diameter pipes, pickling tanks, vats, columns and other process equipment.

Equipment lined with Penton can be made of less-expensive materials, saving on initial cost. Steel tanks, for example, can be fitted with Penton linings to successfully handle highly corrosive liquids.

Buff Values resulting from

Deering, Milliken

Research and Control

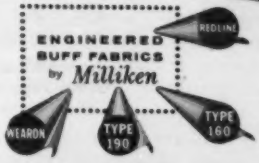
7280 pieces per buff with Milliken Redline vs 5600 pieces per buff from best of all other cloths

Here, in a nutshell, is the success story of one of four Milliken Buff Cloths, each with different finishing characteristics, each superior in its class.

Shower Door Company of Atlanta, Georgia, operating a semi-automatic buffing machine, is using buffs made of Milliken Redline Cloth. This selection was made after extensive comparative tests on the different cloths available, and showed a substantial increase in production per Redline Buff. The superiority of the buffs made of Milliken Cloths can be traced right back to the care with which the cotton is selected and the close control during manufacture.

Four different types of Milliken Cloths are now available. Which would be best for your production would be forecast by comparative production tests both within the Milliken group and against other cloths. Why not make these tests on your production line? Ask your buff manufacturer to make up several buffs of Milliken Wearon, Redline, Style 190 and Style 160. Check the results against your present 'pieces per buff' output.

This 12-page brochure tells about our extensive research, testing and control facilities starting with the cotton fiber through to the finished cloth. Would you like a copy?



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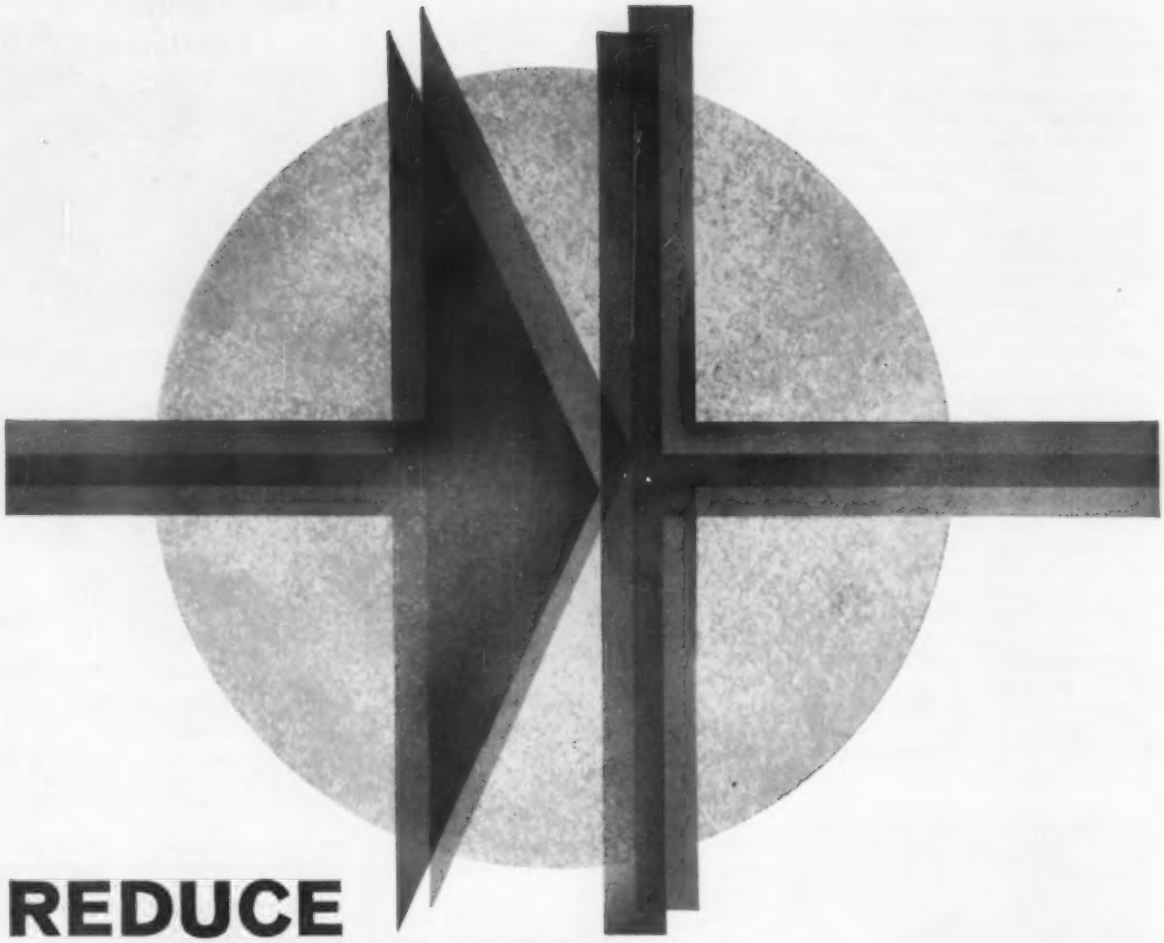

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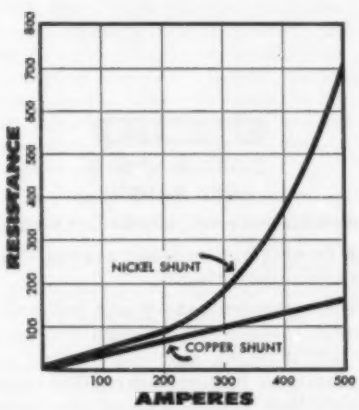
NOW– GENERATOR BRUSH OVERLOAD ELIMINATED

A new H-VW-M Equaload Brush makes overloading impossible. Result: Commutators can now last the life of generators – without resurfacing.

A braided nickel shunt on the new Equaload Brush completely eliminates unequal current distribution because nickel's resistance to current flow increases proportionately with temperature rises. See curve below.



When any brush accepts more than its proportional share of current, the temperature of the shunt rises, its resistance increases and current is immediately distributed equally among the other brushes.

Use of a braided nickel shunt is *exclusive* with H-VW-M. The new H-VW-M Equaload Brush is designed to fit all makes of DC generators.

H-VW-M Form "A" Tank Rheostats – Designed to eliminate all switch failures caused by excessive heating. Standard sizes available with ratings from 30 to 1000 amps. Larger sizes to 5000 amps can be furnished.

H-VW-M Universal Carbon Pile Tank Rheostats – Provide continuous voltage control from fixed plating line voltage source in ranges to 250 amps, 6 to 12 volts.

H-VW-M Motor Generator Sets – Available up to 50,000 amps. Standard voltage ratings are from 6 to 250 volts.

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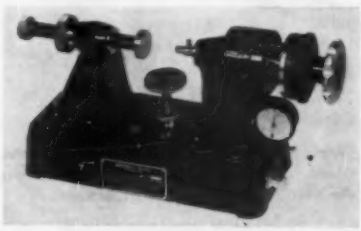
E—915. HARDNESS TESTERS—Advance Industries, Inc. has announced the introduction of a new line of hardness testers which afford what is claimed to be the ultimate in accuracy and portability and which embody an entirely new loading principal. The new testers provide Rockwell hardness readings for all standard and special scales and use loading and penetrators in accordance with ASME and ASTM specifications.

There are two models in the initial offering: the Magnedyne which attaches electromagnetically to the material to be tested, and the Introdyne H-1, the first horizontal unit to be offered to industry. The loading mechanisms of both units utilize a beryllium copper spring, thus eliminating all weights, levers and knife edges and providing permanent calibration.

Standard equipment with the Magnedyne is an adapter shoe which permits the unit to be attached to curved surfaces

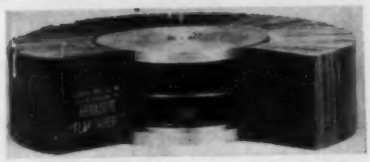


from 2 in. radius to infinity (flat surface). The unit weighs but 23 lb and is portable. It is useful in testing large pieces because it eliminates the necessity of moving or lifting the material to be tested.

The Introdyne H-1 is the first of a series of non-magnetic models employing the new loading principle. Inasmuch as no weights, levers or pulleys are used, this device requires no leveling and can be moved from place to place with no special installation. Although it is designed essentially as a bench unit, the H-1 weighs only 21 lb and can be conveniently used for testing at the job site.

E—916. ABRASIVE FLAP WHEEL—The new Schaffner Abrasive Flap Wheel (Patent Pending) is announced by Schaffner Manufacturing Co.

This abrasive flap wheel is a grinding and polishing wheel that is constructed with up to 1500 cloth backed abrasive coated flaps. The featured innovation is a built in center ring to which all of the flaps are attached. This adds greater sturdiness to the wheel and will prevent it from exploding when at full operating speed. It will adapt itself to the contours of the object being ground or polished, and is claimed to retain its abrasive efficiency until worn down to the hub. It is said that it will do all the jobs done by set-up wheels, sisal or cloth buffs fortified



with greaseless compound, plus the removal of excess stock.

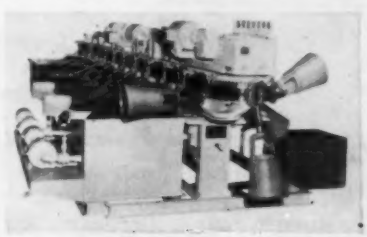
Available in grit sizes 400–60, aluminum oxide or silicone carbide, diameters 6 through 24 in. and flange diameters 3–16 in.

E—917. TRANSDUCER—A new ultrasonic cleaning system developed by the Harris Transducer Corp., a subsidiary of General Instruments, features an all welded stainless steel immersible transducer designed to fit all present tanks used in degreasing and cleaning operations. The new transducer is magnetostrictive and claims the advantages of continuous 300F operation, extra long life, and versatility. Because of its efficient cleaning action, quite large tanks can be ultrasonically activated at minimum installation and operating cost. The system's low voltage requirements minimize electrical shock hazards to personnel. The new unit is built of durable nickel and stainless steel for continuous performance and reliability.

E—918. AUTOMATIC BARREL MACHINE—A new, compact automatic barrel machine for the precision plating and processing of small parts has been introduced by Frederic B. Stevens, Inc.

Measuring only 4 feet high and 6 feet wide, the new barrel machine is an addition to the "Little Steve" equipment.

Designed for incorporation into integrated process manufacturing it offers mechanical flexibility and simplicity of



control. It can be adapted to meet most processing requirements. An exclusive selective "skip track" feature permits elimination or addition of any processing step by simple mechanical adjustment. Built-in dryers are also available as optional accessories.

Extremely low ceiling height eliminates the necessity for catwalks and ladders. The complete operating mechanism, as well as the solution tanks and barrels, are easily accessible to the operator at all times from the plant floor level.

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Best for high-speed, full-bright finish on zinc die castings, steel, brass or bronze.

CONSISTENT MAXIMUM BRILLIANCE—Primary agent suppresses burning, secondary agent operates well in medium and low current density area; both contribute to overall brightness.

COMPLETE COVERAGE—Covers extremely well in low current density areas. Ideal for parts requiring deep throw; produces plate in deep recesses comparable to buffed areas.

ECONOMY—Plates uniformly over high and low current density areas to save on copper consumption. Easy analysis for brightener level.

ISOBRITE® COPPER #623 GENERAL PURPOSE

Ideal for shops with varied operations. Gives full or semi-bright plate on zinc base die castings, steel, brass or bronze.

EASY-TO-USE—A single addition agent for rack or barrel plating. Easily controlled for desired brightness level.

HIGHLY ECONOMICAL—Use as semi-bright at half the cost of full bright solutions.

VERSATILE—Easily buffed to cover wheel marks. Also brightens well in areas not easily accessible to buffing. Use in rack or barrel plating operations.

ISOBRITE® COPPER #625 BUFF BRIGHT

Produces a very soft plate for quick buffing.

A COMPLETELY ORGANIC SYSTEM—No metallic constituents.

VERY ECONOMICAL—Works well over wide variations of temperatures and concentrations.

EXCELLENT FOR STOP-OFF—Produces plate that resists penetration by heat-treating or case hardening.

VERSATILE—Use in cyanide solutions with or without tartrates, Rochelle salts or proprietary substitutes.

These Isobrite Copper Processes contain no lead and are ready to work as soon as current is turned on, even after week-end shut downs. This means increased production and substantial savings by eliminating poorly plated rejects.

Auxiliary Addition Agents for Added Efficiency and Economy

ISOBRITE #630	Aids anode corrosion for greater efficiency and produces finer grained deposits.
ISOBRITE #631	Chrome reducer. Wide range of operation. Forms no undesirable breakdown products.
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E—919. SUBMERGED FILTER SYSTEM.—For a small, leakproof, continuous duty, well constructed but inexpensive and easy to operate filter system to filter small volumes of corrosive solutions, Sethco Manufacturing Corp. introduces a new Sub series of submerged filter systems whose full-view filter chambers form a complete unit with its pump.

These compact submerged filters are claimed to be completely corrosion resistant. There are no wearing parts and there is no danger of aeration or leakage.

The materials of construction make for universal application. For resistance to acids and alkalies, the standard submerged pump and filter chamber is fabricated of high temperature lucite and epoxy with stainless steel 316 fittings. For high temperature applications above 140F, epoxy, stainless steel type 316 or teflon is substituted for lucite in pump and filter chamber.

E—920. PRE-CLEANER—Introduction of Aldet, a silicate-free, soak cleaning, companion-product for Wyandotte Mil-Etch is announced by Wyandotte Chemicals' J. B. Ford Div.

A versatile pre-cleaner for aluminum and other metals, Aldet is recommended for cleaning buffed aluminum prior to bright dipping, etching, anodizing, conversion coating, porcelain enameling, spot welding. Aldet also is recommended for cleaning galvanized iron, steel, and terneplate where a mild, highly buffered, synthetic detergent is desired.

According to the manufacturer, Aldet leaves no residual films to interfere with subsequent processing, will not dull brightly buffed aluminum. When used for cleaning weathered aluminum, Aldet is said to eliminate pitting or streaking.

Aldet was developed as a pre-cleaner for Wyandotte Mil-Etch, a non-scaling, alkaline compound for decorative and deep etching.

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PATENT ABSTRACTS

(Continued from page 1075)

2,929,740, 3/22/60—MOLTEN ZINC BATH—J. Logan, assignor to Wean Engineering Co., Warren, Ohio.

To coat a metal with zinc, immerse in a bath of 10–15 per cent zinc in sodium at 1000F to 1300F with a suitable protective atmosphere.

13 claims.

2,929,742, 3/22/60—ELECTROLESS NICKEL—Clara de Minjer and Abner Brenner, assignors to U.S.A. (Commerce).

The use of selenic acid (0.1 to 10 ppm.) as an additive to increase the rate of deposition of nickel from a hypophosphite—electroless nickel bath.

1 claim, figure.

2,929,766, 3/22/60—PLATING OF IRIDIUM—J. Withers and P. Ritt, assignors to Melpar, Inc., Falls Church, Virginia.

A method of plating molybdenum articles with iridium is described, including cleaning, chromium strike, nickel strike, gold plate and plating with iridium from a molten cyanide iridium bath.

1 claim.

2,929,769, 3/22/60—ELECTROPLATING ANODE—I. Newell and Zavarella, assignors to U.S.A. (Army).

An anode for plating the bore of a tube is described as a cylindrical rod with a plurality of silver and lead areas, alternately disposed on said rod.

8 claims, figure.

2,930,712, 3/29/60—PROTECTIVE METAL COATINGS—H. Homer and J. Whitacre, assignors to Union Carbide Co., New York.

To protect strontium and barium powders, treat with a metal heat decomposable gas in an inert carrier gas.

3 claims, figure.

2,930,723, 3/29/60—SURFACE TREATMENT OF METALS—R. Fraser and I. Burton, assignors to The Waltersation Co., Croydon, England.

A bath to form a zinc orthophosphate coating on a metal surface consists of zinc dihydrogen orthophosphate plus

Free acid	1–8 points
Total acid	15–80 points
NO_3^-	3–30 g/l
Zn^{++}	3–24 g/l

and 0.01 to 1.0 g/l of molecularly dehydrated phosphoric acid.

4 claims.

2,930,740, 3/29/60—TIN PLATING—G. Ward, et al., assignors to Bethlehem Steel Co., Bethlehem, Pa.

A tin plating bath is described as containing stannous sulfate (9–55 g/l), sulfate radical in excess to the stannous tin, sodium fluoride (30–80 g/l), an organic addition agent and sodium bifluoride.

19 claims.

2,923,672, 2/2/60—EXTRACTION OF CHROMIUM, MOLYBDENUM AND TUNGSTEN—G. Ervin and H. Ueltz, assignors to Norton Company, Worcester, Massachusetts.

A fused halide bath containing alkali halides and the halide of a 6th group metal with a 6th group carbide anode is used to deposit chromium molybdenum and tungsten.

32 claims.

2,931,713, 4/3/60—ALUMINUM ETCHANT—N. Newhard Jr. and D. Dollman, assignors to Amchem Products, Ambler, Pa.

The etchant consists of Na or K hydroxide (80–96 per cent), tartaric acid (3–10 per cent), and an alkali phosphate (0.025–2.5 per cent).

6 claims.

2,931,758, 4/5/60—ELECTROCHEMICAL METHOD—E. Zimmerman, assignor to Philco Corporation, Philadelphia, Pa.

A method for codepositing indium and gallium consists of preparing a special electrolyte by dissolving indium trichloride and ammonium chlorogallate in glycerol, then plating at 15 to 30 amp/cm^{-2}.

15 claims.

2,931,759, 4/5/60—SOLDERABILITY OF TIN PLATE—U. Hill, assignor to Inland Steel Co., Chicago, Illinois.

In the process of using an aqueous water soluble silicate to inhibit flow brightening of tin plated steel, it is claimed a subsequent hydrofluoric acid dip to remove the residual silicate assists soldering.

7 claims.

2,931,760, 4/5/60—ACID COPPER PLATING—Leon Westbrook, Solon, Ohio.

The use of a polyoxyethanol compound, molecular weight over 300, in conjunction with chloride or bromide ions is claimed to produce uniform copper deposits with superior physical properties.

10 claims.

2,931,764, 4/5/60—ELECTROPLATING APPARATUS—R. Pyles, assignor to Van Der Horst Corp., Olean, N. Y.

An apparatus for plating crankshaft bearings is described.

5 claims, figure.

2,932,584, 4/12/60—ENAMELING ALUMINUM—D. Hubbell and E. Weaver, assignors to H. H. Robertson Co., Pittsburgh, Pa.

Before applying the enamel slip, treat the aluminum alloy with an alkaline solution containing tungstic or molybdic oxide and a chelating agent.

See also **2,932,585** describing in 2 claims a similar treatment with antimony oxide instead of molybdic or tungstic oxides.

26 claims.

TWO BOOKS
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1. The AES book TECHNICAL PROCEEDINGS (1960 Edition) containing the technical papers presented at the AES's 47th Annual Convention, Los Angeles, California, July 24–28, 1960, including the transcript of the discussion that attended the delivery of each paper, plus other features.

2. The book on "Hydrogen Embrittlement in Metal Finishing" edited for AES by Dr. Harold J. Read of Pennsylvania State University.

WATCH PLATING MAGAZINE'S MONTHLY AES BOOK SECTION FOR FURTHER INFORMATION

ARTICLE REFERENCES

By
WILLIAM TUCKER
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Rochester, N. Y.

Most of the articles listed here may be obtained by writing to the publications in which the articles were published. Addresses are given at the end of the references for the reader's convenience.

Photostat or microfilm copies of articles in available magazines may be obtained from: Library of Congress, Washington, D. C.; New York Public Library, New York; Engineering Societies' Library, New York, at prevailing rates. In other cases, consult Wilson's Union List of Serials at your nearest public library for other sources of these articles.

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108. ZINC
ULTRASONICS IN ZINC ELECTROPLATING. EFFECT ON ELASTIC PROPERTIES OF STEEL.
Larissa Domnikov.
Metal Finishing, June 1960, *58*, No. 6, pp. 59–61.

109. ALUMINUM
SEALING ANODIZED ALUMINUM—SODIUM SULFITE IMMERSION TEST.
W. E. Cooke and R. C. Spooner.
Metal Finishing, July 1960, *58*, No. 7, pp. 83–84.

110. ANALYSIS
DETERMINATION OF THE SULPHATE CONTENT OF CHROMIUM PLATING SOLUTIONS BY A COMBUSTION METHOD.
R. St. J. Emery.
Electroplating and Metal Finishing, July 1960, *13*, No. 7, pp. 253–257, 261.

111. BARREL PLATING
PRECISE BARREL FINISHING.
Ralph F. Enyedy.
Metal Finishing, July 1960, *58*, No. 7, pp. 85–90.

112. CHEMICAL MILLING
CHEMICAL MILLING AT WORK.
Lew B. Stearns.
Products Finishing, July 1960, pp. 72–77.

113. CHEMICAL POLISHING
a. *CHEMICAL AND ELECTROLYTIC POLISHING.*
F. H. Wells.
Electroplating and Metal Finishing, June 1960, *13*, No. 6, pp. 197–204.
b. *RECENT TRENDS IN ELECTRO- AND CHEMICAL POLISHING.*
R. Pinner.
Electroplating and Metal Finishing, June 1960, *13*, No. 6, pp. 205–214.

114. CLEANING
ULTRASONIC CLEANING OF SHOTBLASTED STRIP.
H. F. Osterman and John E. Erhardt.
Ultrasonic News, Summer 1960, pp. 7–9.

115. ELECTRODEPOSITION
EXPERIENCES IN THE DECORATIVE PLATING OF ZINC ALLOY DIE-CAST COMPONENTS.
J. Chadwick.
Electroplating and Metal Finishing, July 1960, *13*, No. 7, pp. 239–245.

116. ELECTROPOLISHING
ELECTROPOLISHING—A MULTIPURPOSE PROCESS.
Harold W. Bredin.
Machinery, July 1960, *66*, No. 11, pp. 113–115.

117. MANAGEMENT
CALCULATING METAL FINISHING COSTS. 8th Installment.
Bernard Gaida.
Plating Management, July 1960, pp. 13–14.

118. ORGANIC
a. *SYNTHETIC RESINS—THE BACKBONE OF MODERN FINISHES. PART II—SILICONES.*
Harold P. Preuss.
Metal Finishing, July 1960, *58*, No. 7, pp. 94–99.
b. *ASSESSMENT OF PAINT DURABILITY—ACCELERATED WEATHERING VERSUS EXTERNAL EXPOSURE.*
S. K. Bose and S. N. Mukerji.
Corrosion Technology, June 1960, *7*, No. 6, pp. 167–170.
c. *MASONRY AND CONCRETE CORROSION REDUCTION BY SILICONE TREATMENT.*
Corrosion Technology, June 1960, *7*, No. 6, pp. 176–178.

119. PICKLING
a. *PICKLING BEFORE ELECTROPLATING.*
N. P. Fedot'ev and S. Ya. Grilikhes.
Electroplating and Metal Finishing, June 1960, *13*, No. 6, pp. 217 and 220.
b. *ULTRASONIC PICKLING AT LYCOMING.*
Edward Sietz.
Ultrasonic News, Summer 1960, pp. 4–5.

120. RESEARCH
HIGH CURRENT ELECTRONIC INTERRUPTER FOR THE STUDY OF ELECTRODE PROCESSES.
W. E. Richeson and M. Eisenberg.
Journal of the Electrochemical Society, July 1960, *107*, No. 7, pp. 642–647.

121. VACUUM COATING
VAPOUR PLATING BY VACUUM EVAPORATION.
B. J. Williams.
Electroplating and Metal Finishing, July 1960, *13*, No. 7, pp. 247–251.

The following are Metallurgical Abstracts taken from The Journal of the Institute of Metals, May 1960, pp. 573, 575 and 576:

122. ALUMINUM
SEALING ANODIZED ALUMINUM.
J. M. Kape.
Metal Ind., 1959, 95, (6), pp. 115–118.

123. CHROMIUM
a. *ON THE DEPOSITION OF CHROMIUM FROM COMPLEX CHROMIUM SULPHATE SOLUTIONS.*
Willi Machu and M. F. M. El-Ghandour.
Werk-Stoffe u. Korrosion, 1959, 10, (9), pp. 556–563.

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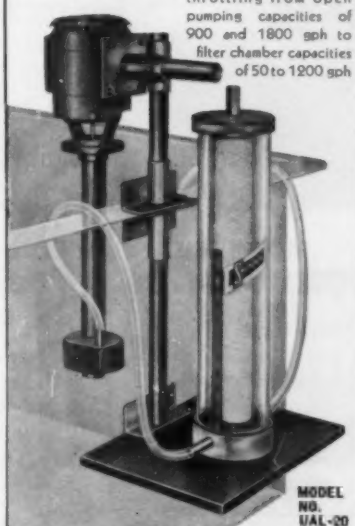

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b. *EQUI-HARDNESS CURVES FOR CHROMIUM PLATE IN RELATION TO TEMPERATURE AND CURRENT DENSITY.*
G. Rousselot.
(Galvano, 1959, (275), pp. 585–588; discussion, 81–82.

c. *METAL-SPRAYING BY PISTOL, AND HARD-CHROMIUM PLATING.*
R. deBuyer.
(Chrome Dur, 1959–60, pp. 70–74; discussion, 74).

124. ELECTRODEPOSITION
PROCEDURES FOR ELECTROPLATING COATINGS ON REFRACTORY METALS.
John G. Beach and John A. Gurklis.
Battelle Memorial Inst. Rep., 1959 (DMIC-Memo-35), 26 pp.

125. MISCELLANEOUS
PLATING ANODES.
D. J. Fishlock.
Metal Ind., 1959, 95, (8), pp. 162–166; (9), 177–180.

126. NICKEL
SOME INVESTIGATIONS INTO BRIGHT FINISHING IN NICKEL BATHS AND THE INFLUENCE OF IMPURITIES.
A. Chaybany.
(Metal Finishing J., 1959, 5, (55/56), pp. 263–268.

The following is a metallurgical abstract taken from The Journal of the Institute of Metals, April 1960, p. 527:

Electrodeposition of Nickel with Superposition of Alternating Current. I.—The Structure of Deposits Obtained from Solutions in the Absence of Surface-Active Agents. II.—Solutions Containing Surface-Active Agents. A. A. Sutyagina and K. M. Gorbunova* (Zhur. Fiz. Khim., 1959, 33, (9), 1982–1987; (10, 2128–2134).—(In Russian). I. The effect of varying *p*H (1.9–6), cd (ac) (1–12 amp/dm²), and cd (dc) (1–3 amp/dm²) on the size, shape and orientation of Ni deposits was studied at room temp. At *p*H 5.9 and cd (dc) 2 amp/dm² a smooth, finely cryst. deposit orientated along (110) direction was obtained. On superposition of ac (50 c/s) on dc with the same cd there was no noticeable change in properties, but when the ratio, λ, cd (ac): cd (dc) exceeded > 1, the crystal size increased, the orientation changed to (001), and current efficiency and coeff. of reflectivity decreased. With increase of frequency these effects diminished and disappeared altogether at 500 c/s. At *p*H 2.0 the deposit obtained at cd (dc) 2 amp/dm² was coarsely cryst. and did not show preferred orientation. Superposition of ac had no effect. 10 ref. II. The effect of 3 g/l of 2, 6–2, 7 naphthalene-disulphonic acid, 0.1 g/l thiourea, 0.1 g/l allyl-thiourea, 0.13 g/l aniline, and 8 cc/l formaldehyde on light reflectivity and crystal structure of electrodeposited Ni was studied, using ac superimposed on dc. With λ = 1 there was no effect on the reflectivity or crystal orientation. With λ = > 1 reflectivity decreased sharply with all addn. agents and crystals were orientated along the (001) direction except with allyl-thiourea which did not show any preferred orientation, regardless of the type of orientation of the blank deposited with dc only. All deposits were coarse and striation present during the first stage of electrodepn. disappeared completely on prolonged deposition. Deposits obtained with 500 c/s even at λ > 1 were similar to deposits obtained using dc only. Possible causes of these phenomena can be ionization of H adsorbed on the cathode or combined with Ni as hydride. 17 ref.

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England
Galvano
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Mount Vernon, N. Y.
Werkstoffe und Korrosion
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Weinheim/Bergstrasse
Germany

TRADE LITERATURE

L—901. DEIONIZER—Elgin Ultra-DeIonizers of mixed-bed design are described in Bulletin 512A and its accompanying technical data. This ion exchange equipment, which contains a mixture of cation and anion resins in a single tank, removes all ionizable impurities including silica and carbon dioxide from water. Low operating cost, minimum space requirement and simplicity of operation are among the desirable features claimed for these deionizers.

An important feature is its special "double check" manifold system which guards against loss of valuable ion-exchange resins during regeneration and permits use of a deeper ion exchange bed to give greater deionized water output.

L—902. CHEMICAL MILLING—Reprints are available from Chemical Contour Corp. of a comprehensive article on the state of the art in chemical milling. The four-page, 2-color reprint describes how chemical milling is now used in processing steel and other metals on a mass-production basis. Advantages of chemical milling over machine methods are cited.

L—903. INFRARED OVEN—A complete line of infrared heating equipment and infrared ovens for all types of commercial and industrial applications has been introduced by Radcor, Inc.

The equipment in the line consists of components, modular oven sections, that can be used singly or constructed in custom form by the customer, and a group of oven units designed and built for basic commercial and industrial operations. These ovens include batch type, vertical, horizontal, portable, tower, coal and ore car thawing types and ovens for use with monorail or floor-type conveyors.

L—904. PHOSPHATE CLEANER—Kelite Corp. offers free bulletins on Kelite Kotekleen and Keynote 25, a pre-organic finish composition for use on such products as appliances, metal furniture, steel drums, and other fabricated metal products.

Keynote 25 solutions operate in a low *p*H range (2.7 to 4.0) in one to six stage spray washes, immersion, or steam phosphatizing methods. Keykote 25 is a powdered phosphate composition and not an iron phosphate although it competes in that class.

Kotekleen is a liquid detergent used in conjunction with Keykote 25 to form an active cleaning bath.

L—905. EXHAUST SYSTEMS—A new brochure, prepared by Industrial Plastic Fabricators, Inc., describes the company's complete exhaust systems. Fabricated from polyvinyl chloride, polyethylene and polypropylene to customer specifications, these systems, complete from fan to outside weather cap, provide superior corrosion resistance for all fume handling problems. Installation data sheets are supplied with the brochure.

L—906. PORTABLE SANDBLASTER—Recently developed and marketed nationally by Hamill Manufacturing Co., Inc., is the new, portable sandblasting unit known as the Handi-Blast portable sandblaster. It requires no more air than a production spray gun.

The "Handi-Blast" is useful for quickly cleaning rust and paint from body panels—leaving a clean, dry etched metal surface.

The manufacturer states that this sandblaster is the only sandblaster that is completely portable. The over-all height of the unit is 23 inches with a tank diameter of 7 inches. The unit weight is 23 pounds empty and has an abrasive capacity of 30 pounds sand.

L—907. BARREL TUMBLER—A new catalog sheet describing Tumb-L-Matic's line of LS Type barrel tumbling equipment for finishing and defining plastic and metal parts by the dry process is available free.

L—908. VIBRATORY MACHINES—A comprehensive, three-color catalog that describes, illustrates and provides technical information on Almco's seven vibratory machines is now available from Almco, Queen Products Division, King-Seeley Corp.

The brochure also illustrates and describes a wide variety of 'before and after' views of parts finished with Almco machines and methods.

L—909. TEMPERATURE REGULATORS—The 1960 edition of the Sarco Condensed Catalog contains 12 pages of technical details, dimensions and capacity data on the most widely used devices in the Sarco line of steam traps, temperature regulators and heating specialties. Copies may be obtained on request.

L—910. BARREL FINISHING MEDIA—A 4-page bulletin containing specifications on all Lorco media and compounds for barrel finishing and vibratory finishing has been published by Lord Chemical Corp.

Bulletin No. 901 gives details of all preformed and natural media used for barrel and vibratory finishing and lists all of the Lorco compounds for both types of finishing, including new formulas devised especially for vibratory compounds.

L—911. COSTS CALCULATOR—The precious metals plating costs calculator developed by Sel-Rex Corp., which permits instant determination of costs for plating precious metals per unit area to specified thicknesses, has been reprinted and is available once again.

In addition to costs, the 'slide rule' also tells at a glance: Cathode efficiency data; milligrams per square inch and grams per square foot of specific precious metals for .0001 in. deposits; recommended current densities and actual plating time for 10 different precious metal electroplating formulations.

The Sel-Rex Precious Metals Plating Costs Calculator reportedly integrates the logarithmic progression scale of conventional slide rules, with specific gravity graduations, in order to provide accurate readings on costs and thickness data.

L—912. POLISHING MILLS—A new 8-page, two color illustrated catalog describing sheet polishing mills for finishing metal sheets, plates and coils is now available from Acme Manufacturing Co.

Typical applications for the line of sheet polishing mills described in the catalog pre-polishing carbon steel sheets in the automotive industry, conditioning of stainless steel coil stock and sheet polishing in the steel industry, polishing sheet and plate to standard finishes by polishing jobbers, and for sizing material to a variety of thicknesses for experimental engineering and pilot line development work in the aircraft industry.

Also included are typical polishing mill case history applications and two color floor layouts of automated Acme sheet polishing lines including the 343-ft long high production line installed at the Ford Motor.

L—913. METAL FINISHING GUIDE—New 4-page guide made available by The Lea Mfg. Co. contains condensed information on materials for such finishing operations as buffing, polishing, burring, satin finishing, buffing wheel set-ups and wheel cements. There is also a section on additives and specialties for bright plating processes for gold, silver, copper, nickel, cadmium, brass and zinc plating.

L—914. DIP COATING—Bulletin M-800 from Bee Chemical Co. describes a new water soluble, water thinnable and nonflammable dip coating for the protection of brass and brass plated steel products. The bulletin gives product and application information and test results data.

L—915. ULTRASONIC GENERATOR—A data sheet available from National Ultrasonic Corp., describes the firm's Model G-310 generator. The generator is rated at an output of 1000 watts average power and 2000 watts peak power at 38 to 42 kc and will drive 192 sq in. of barium titanate crystal radiating surface. It is recommended for conveyorized, batch or manual production line cleaning and degreasing, pilot plant testing of large-scale cleaning operations or adding ultrasonics to a conventional vapor degreaser or other cleaning equipment.

L—916. ANODES—A 6-page brochure is available from Univertical Corp. describing the "T" bone design nickel anode which in plating tests is claimed to have resulted in smooth electrodeposits of nickel during electrolytic erosions with a minimum of undissolved metallic particles and impurities eroding smoothly without shedding and flaking. Other Univertical products also are described.

L—917. ADDITIVE—An additive for steel blackening baths which prevents the formation of red smut on blackened work has been developed by Enthone, Inc. Known as Ebonol Additive "S," the new product ties up dissolved iron and copper so that they cannot deposit on the blackened steel as red iron hydroxide or red copper smut. Additionally, it produces a deeper black color and reduces blackening time.

Ebonol Additive "S" is a viscous liquid which may be added to any hot, alkaline blackening solution for steel such as Enthone Ebonol S-30. An addition of 4 av oz/gal will counteract the effects of 0.5 oz/gal of dissolved iron and 0.03 oz/gal of dissolved copper. The product consists of complexing agents which are stable to the oxidizing agents, high alkalinity and high temperatures encountered in steel blackening baths. It has no adverse effect on the corrosion resistance of the resulting black oxide coating. Literature is available.

24 million pot lids can't be wrong!

Ask your wife. She will tell you about famous Revere Ware. Probably best known by their copper bottoms, the durable luster of pots and pans by Revere is taken for granted.

"Taken for granted" is exactly the phrase applied to the 3 Packer-Matic polishing and buffing units in Revere's Rome, N. Y. plant by Mr. F. W. Merry, Assistant Works Manager. "We feed them and our Packer-Matics do the rest," says Mr. Merry. "They haven't failed us in 23 years of high production rate operation." "They get a good clean up twice a year and that's about the extent of our maintenance."

Achieving highly reflective finishes on pot lids is only one of hundreds of polishing, deburring, buffing and cleaning applications Packer-Matics have handled since Mr. Clifford I. Packer turned out his first unit in 1927. Chances are we can help you in your finishing operations, too. Send us samples with your specifications or blueprints and see.

Production reliability makes Packer-Matic the choice of companies like Revere Copper and Brass Inc.

PACKER-MATIC

THE PACKER MACHINE COMPANY • MERIDEN, CONN.

Pioneer Manufacturers of Automatic Polishing & Buffing Machines

NEW VYCOTE VINYL AEROSOL

FOR USE IN

ELECTROPLATING and ANODIZING
MASKING RACK COATING HOOKS
REPLACEMENT TIPS DUCTS & VENTS

RESISTANT TO . . . ACIDS • FUMES
ALKALI • SALT SPRAY
GOOD ADHESION • ELECTRICAL INSULATOR

VYCOTE is a convenient aerosol spray can for quick touch up . . . it dries in minutes to a tough durable plastic coating. Has many uses in one fast easy application.

VYCOTE is made of a high quality vinyl which coats evenly and prevents corrosion under severe exposure conditions.

VYCOTE improves appearance and protects against action by water, alkalis, acids, salt spray and adheres to clean metal and other coated or uncoated surfaces.

VYCOTE in addition to sealing out moisture may be used as an electrical insulator and has good dielectric properties.

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JOURNAL SQUARE STATION
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AVAILABLE
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PREPAID
ONE POUND
SPRAY CAN

USE READER SERVICE CARD; INDICATE A 946.

Better Buffing and Polishing?

ANSWER: ALWAYS USE

FORMAX COMPOUNDS

Formax manufactures a complete line of Buffing and Polishing Compounds in bar, tube and liquid form suitable for all classes of metal, plastic and lacquer finishes. Formax compounds used together with the famous Formax ZIPPO long wearing buffing wheels make a combination that's hard to beat. Our extensive manufacturing, laboratory and testing facilities are always at your disposal.

Descriptive Catalogs Available on Request.

FORMAX MFG. CORP.
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"THE FOUR McALEERS"

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Backed by 59 Years of Specialization

Rhodium
ELECTROPLATING SOLUTIONS

Rhodium electroplate is suggested for these applications: on wave guides and microwave equipment which may be used in marine atmosphere; in printed circuits; in electrical contacts where light contact pressure and low voltages are involved . . . Rhodium is very hard and corrosion-resistant.

This Rhodium plating solution is easy to use. It operates over a wide range of temperature and current densities. We will be glad to plate samples without charge.

Consult our staff

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SIGMUND COHN MFG CO., INC. — 121 SOUTH COLUMBUS AVE. MOUNT VERNON, N.Y.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 948.

PERSONALS

OTTO R. KUHN has been appointed to the post of purchasing engineer of the newly formed Hampden Chemical and Equipment Co., Philadelphia 37, Pa., a subsidiary of Hampden Color and Chemical Co. of Springfield, Mass. Mr. Kuhn brings with him 19 years of experience as a plating engineer and as a purchasing agent with The Reynolds Co. and Penn Fishing Tackle Manufacturing Co., both of Philadelphia.

O. R. Kuhn

L. Henderson

LARRY HENDERSON, for the past six years with the Los Angeles sales office of McKesson & Robbins, Mefford Chemical Company Branch, has been appointed to open and manage the new San Francisco office of the McKesson Chemical Division. Mr. Henderson will be located at 354—21st Street, Oakland, California, which office will serve Northern California. He is a member of the American Electroplaters' Society, past president of the Jackson-Lansing (now Central Michigan) Branch and was recently appointed Far Western Regional Research Finance Chairman of the AES Research Committee.

♦

KENNETH L. LYTTLE has been named advertising manager of Diamond Alkali Co.

At his newly-created position in Diamond's general sales department, Mr. Lyttle will assist the company's seven divisions in formulating their advertising and promotional objectives.

He brings more than nine years of diversified advertising experience to his new connection. He joins Diamond from American Steel & Wire, Division of U. S. Steel, Cleveland, where he was an advertising assistant for the past four years.

♦

ROBERT G. DOW has been appointed a field salesman for the Chicago Branch sales office of Diamond Alkali Co. Mr. Dow succeeds H. T. Woollacott, a 40-year Diamond veteran who died March 31, 1960.

After graduating from Tufts College, Medford, Mass. in 1951 with a BS degree in chemistry, he spent four years as a technical sales and service representative in the leather industry field. He joined Diamond in October 1955 as a technical serviceman.

♦

KENNETH J. CAVE is appointed technical sales representative by Heatbath Corp. for the Southern Ohio and West Virginia territory. Ken Cave is a graduate of Notre Dame University and was associated with Oakite Products prior to joining Heatbath. He will handle sales of Heatbath's complete line and will have headquarters in Columbus, Ohio.

PETE PETROFF has been transferred to the home office in Springfield, Massachusetts where he will assume new duties as Eastern District sales supervisor.

♦

HOWARD L. WRIGHT has joined Enthone, Inc. of New Haven, Connecticut, subsidiary of American Smelting and Refining Company, as a sales engineer. He will represent Enthone in southern New Jersey and the Philadelphia and Allentown areas of eastern Pennsylvania. Mr. Wright is a graduate of Franklin and Marshall College. For the past 14 years he has represented the Hanson-Van Winkle-Munning Company and was previously district manager of the Philadelphia office. He is a member of the Philadelphia Branch of the American Electroplaters' Society.

H. L. Wright

D. Hocker

DON HOCKER has been named as technical sales representative in southern Indiana, Cincinnati, Ohio and the Kentucky area for Heatbath Corp. Mr. Hocker will handle Heatbath's complete line of metal finishing and heat treating products and processes. He will have headquarters at 2122 E. 71st. St., Indianapolis, Ind.

♦

FORREST F. HINCKLEY, for the past 14 years with Aeroquip's Western Division, recently resigned as vice president and general manager. He has purchased the Speed-D-Burr Corp., where he will serve as president and general manager.

For over 15 years Speed-D-Burr has designed and produced precision barrel-finishing equipment.

♦

WILLIAM E. BRANDT JR. is assigned to the Pangborn Corp. Hagerstown office, **BARRY L. SELACK** to Cleveland and **JOHN G. WEBER** to Milwaukee for Pangborn. All three men are process engineers.

♦

ALDO J. SARTOR joined Pangborn Corp.'s Detroit office as sales engineer. He was formerly Detroit Branch Manager, King-Seely Corp., Almco-Queens Products Div., specializing in precision metal finishing.

♦

CHARLES P. EGOLF has been appointed assistant manager of Diamond Alkali Co.'s southeastern sales office in Memphis, Tennessee.

To this newly-created position in which he has been serving since March, Mr. Egolf brings a background of 14 years' experience as a salesman and research chemist. He joined Diamond in 1953 as a field salesman becoming a senior salesman two years later.

He is a graduate of Wesleyan College, West Va. where he earned his BS degree in chemistry and biology.

♦

FREDERIC R. KELLOGG has been elected chairman of the board, **EDWARD R. JONES,** president and chief executive officer, and **RICHARD F. PUFFER,** vice president and director of the Industrial Division of The Hubbard-Hall Chemical Company of Waterbury, Conn.

Mr. Kellogg has been president of Hubbard-Hall for many years and is well known throughout the chemical industry. Mr. Jones, formerly executive vice president, is also treasurer of Hubbard-Hall. Mr. Puffer was formerly assistant general sales manager of the American Brass Company of Waterbury. He will coordinate industrial chemical and metal finishing product sales and product development.

♦

OSCAR RENNELLS, Lower Maple Avenue, R.D. 2, Elmira, N. Y. has been appointed as exclusive representative for the State of New York by Ionic Electrostatic Corporation of Garfield, N. J.

Rennells will handle all inquiries for the area for all Ionic equipment and will provide sales and service assistance to all industries.

MUNRAY
PLATING COATINGS

PC-7 **AIR-DRY COATING . . .**

The standard of the plating industry for 15 years. Requires no primer, no baking. Ideal for racks, fans, exhaust systems, patching plastisol coatings, tank patching, and other difficult areas and equipment requiring corrosion protection.

PC-21 **PLASTISOL GENERAL PURPOSE COATING . . .**

The ultimate bake-on Vinyl coating for permanent protection of racks, tanks, pipe and equipment. Provides coating thickness to 3/16" with one application, and is immune to effects of all plating chemicals.

SO-8 **STOP-OFF LACQUER . . .**

Won't creep when applied, won't allow underplating, strips like magic. How much easier can selective plating be made?

V-10 **AIR-DRY PERMANENT COATING**

Another unique Munray development of a modified Vinyl formulation to allow easily applied protection to large surfaces, such as complete walls, large processing equipment, hoods, and ducts, tank exteriors.

Write for catalog

MUNRAY PRODUCTS, DIVISION TEXTRON INC.
SPECIALISTS IN ENGINEERED PLASTICS
12412 Cressburn Avenue, Cleveland 35, Ohio • Distributors in All Major Cities

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TRUE BRITE
Practical Products

TRUE BRITE Nickel Brightener
the original high performance barrel nickel brightener. Still the standard.

BRASS MAINTENANCE Solutions
the easy way to control of color and performance of brass plating.

OXYPHEN pH Papers
Over 30 ranges to suit all possible solutions and conditions.

SODIUM and POTASSIUM Copper Cyanides
Highest quality soluble salts from our own production for all solutions.

Bulletins available on all products

TRUE BRITE CHEMICAL PRODUCTS CO.
96 Falls Ave. Oakville, Conn.

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MANHATTAN RUBBER LINING
PROTECTS COSTLY PICKLING AND PLATING EQUIPMENT
...*Permanently*

STOP CORROSION
STOP CONTAMINATION

Photo courtesy Hanson-Van Winkle-Munning Co.

- THICK, MULTIPLE CALENDERED SHEETS
- INSEPARABLE RUBBER-TO-METAL BONDS
- ELIMINATE DANGEROUS "STRAY CURRENTS"
- NATURAL OR SYNTHETIC RUBBER
- WON'T HARDEN, CRACK OR OXIDIZE
- TESTED UNDER HIGH VOLTAGE

Be *certain* of lifetime protection for your costly equipment and protection against contamination of expensive plating baths. Specify Manhattan lining on your next tank lining job.

MANY MANHATTAN LINED TANKS HAVE BEEN IN CONTINUOUS USE OVER 30 YEARS!

ENGINEERED RUBBER PRODUCTS .. MORE USE PER DOLLAR

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Rubber Lining Plants at Passaic, N. J. • North Charleston, S. C. • Neenah, Wis.

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Save More

IMMEDIATE SHIPMENT!

Select from one of the nation's largest stocks of guaranteed rebuilt electroplating motor generator sets and rectifiers with full control equipment.

PLATERS

1—10000/5000 AMPERE, 6/12 V. 40° C. **CHANDEYSSON** Synch.

1—7500/3750 AMPERE, 9/18 VOLT, **H-VW-M**, Synch. 40° C.

1—6000/3000 AMPERE, 6/12 VOLT, **ELECTRIC PRODUCTS**, Synch.

1—5000/2500 AMPERE, 12/24 VOLT, **CHANDEYSSON**, Synch.

1—5000/2500 AMP., 9/18 V., 40° C., **CHANDEYSSON**, Synch.

1—5000/2500 AMPERE, 6/12 VOLT, 25°C. **CHANDEYSSON**, Synch.

1—4000/2000 AMPERE, 6/12 VOLT, **H-VW-M**, Synch.

1—3000/1500 AMPERE, 12/24 VOLT, **CHANDEYSSON**.

1—2000/1000 AMPERE, 6/12 VOLT, **H-VW-M**.

ANODIZERS

1—1000 AMPERE, 40 VOLT, **CHANDEYSSON**, 25°C. and other sizes in stock for immediate delivery; write for details

RECTIFIERS

1—**H-VW-M** Selenium 5000 Amp., 6 V. S.C.F.C. 440/3/60.

3—**H-VW-M** Selenium 3000 Amp., 6 V. S.C.F.C. 440/3/60.

1—**NEW G. E.** 2000/1000 AMPS., 6/12 V. Remote Control 440/3/60 A.C.

2—**RAPID**—1500 Amp. Periodic reversers.

3—**RAPID** 500 Amp. Periodic Reversers.

SPECIAL

2—**CROWN** Centrifugal Driers No. 1 with Heat.

1—R100 **RONCI** Enameler.

3—**LASALCO** Ball Burnishers, No. 1, 2 & 4, Lined or Unlined.

10—Buffing Lathes—**HAMMOND, DIVINE, U. S.**, etc., from 3 H.P. to 20 H.P. Single & variable speed.

2—**INDUSTRIAL** RDR-1 & 2 Rubber Lined Filters, Sizes 10x28, 14x36.

2—**INDUSTRIAL** Type SC Filters for Cyanide. 18x48 and 18x36.

1—**PRODUCTION** Model A pipe polisher with feed troughs.

3—**PRODUCTION** No. 101 pipe polishers. Individual or in tandem

1—**HAMMOND** pipe polisher

3—**STEVEN BADER** Belt Polishers

3—**AMERICAN** Blower type HS fans. Size 330-10.

8—**DUSKOP** Dust Collector Cabinets. Sizes No. 550, No. 850.

1—NEW Model B **NIEHAUS** S. S. fume separator.

1—**H-VW-M Munning-** Type (Mechanical lift), Full Automatic, Plating Machine 70' long x 4' wide x 36" deep x 10½' overall height.

1—**CROWN** 48 x 36, 2 compartment horizontal tumbling barrel lined or unlined.

5—**MERCIL** Nickel plating barrels 12" x 36" with R. L. tanks.

3—**DANIELS**—30LS plating bbls.

1—**ACME** L8L Semi-Automatic buffing machine. 8 spindles with 2 7½ HP heads.

Other outstanding values in stock.

1929—1959 — 30 Years of Service.

M. E. BAKER CO.

Kirkland 7-5460

25 Wheeler St., Cambridge 38, Mass.

F. P. DeLuca Jr.

R. L. Rod

FRANK P. DeLUCA JR., who joined Acoustica Associates, Inc., in 1957, has been named president of the corporation and its subsidiaries.

ROBERT L. ROD, founder-president, will assume the newly-created position of chairman of the board. Corporate headquarters were moved to Los Angeles from Plainview, Long Island, New York, last March.

♦

ROBERT S. BAKER has been appointed vice president—manufacturing of The American Brass Co. Mr. Baker, director of mill operations since 1952, succeeds **SYDNEY H. WARDELL,** who will retire.

A native of Cleveland, Mr. Baker received a BS degree in metallurgy from Yale University in 1925. That year he started with American Brass as a trainee in the company's laboratory. In 1935, he was appointed service engineer at Waterbury and in 1939, he was appointed technical supervisor to the Torrington division.

He became assistant works manager of the Torrington division, in 1946, and its works manager in 1948. Four years later, Mr. Baker returned to the company's headquarters as director of mill operations.

♦

VICTOR H. HARRIS has been named manager of the new projects office of Vitro Laboratories, West Orange, N. J.

Mr. Harris joined Vitro in Silver Spring, Md., in 1948 and was transferred to the West Orange facility in 1957. He has been head of the arc research and development department at West Orange and the engineering studies department at Silver Spring.

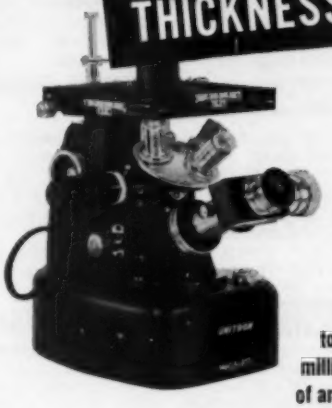
Previously, he was with Johns Hopkins University Applied Physics Laboratory. During World War II, he served with the Columbia University Division of War Research as civilian sonar consultant to the U. S. Navy submarine forces in the South Pacific and Australia.

♦

J. A. HUGHES and **W. H. McCONNELL** have been elected to the positions of senior vice presidents of Diamond Alkali Co. Mr. Hughes has held the position of vice president—administration and secretary, and Mr. McConnell, vice president—marketing. Both men are members of the board of directors, and in addition to

WHY GUESS ?

MEASURE PLATING THICKNESS



to a millionth of an inch

Your profits depend on meeting tight specifications, maintaining quality control and reducing rejects. Can you afford to guess at plating thickness when it is so easy to measure and be sure?

UNITRON'S PL-MEC PLATER'S MICROSCOPE **substitutes facts for uncertainty. The plated deposit is observed through a Filar Micrometer Eyepiece and measurements are read directly from a micrometer drum. This compact microscope is easy to use, portable around the shop and has a built-in light source. It also doubles as a metallurgical microscope for examining grain structure etc. at magnifications of 25X-1500X. Permanent photographic records may be made using an accessory 35mm. camera attachment and provide valuable legal protection for subcontractors.**

UNITRON'S PLATER'S MICROSCOPE **will save its initial cost many times over. Prove this for yourself — as so many firms in the plating industry have done—by requesting a FREE 10 DAY TRIAL in your own plant. There is no cost and no obligation.**

Above: Accessory camera attachment.
Left: Observing the plated deposit.

$468 Model PL-MEC complete with all optics and standard accessories

As above with built-in camera attachment, but without 35mm. camera back: **$540**

THE TREND IS TO UNITRON

UNITRON

INSTRUMENT DIVISION OF UNITED SCIENTIFIC CO.

204-206 MILK STREET, BOSTON 9, MASS.

Please rush UNITRON's Microscope Catalog 37-G

Name_____

Company_____

Address_____

City_____ State_____

continuing their present activities, they will assume broader management responsibilities.

J. W. MANTZ, general manager—soda products division, has been appointed director of trade development, a new position.

A. B. TILLMAN, general manager—electrochemicals division, was named general manager—soda products—chromium division, a combination of the soda products and chromium chemicals divisions.

F. W. JARVIS, general manager—chromium chemicals division, was appointed general manager—electrochemicals division.

♦

RICHARD D. WHETSTONE has been named eastern division manager of industrial carbon sales for National Carbon Co., Division of Union Carbide Corp.

In his new position, Mr. Whetstone will be responsible for the sales of a wide range of carbon and graphite products for industry in the eastern portion of the United States.

A native of Wayne, Pa., he was graduated from Gettysburg College in 1953 and joined National Carbon that year in the production organization at its Clarksburg, W. Va., plant. Transferring to sales work in 1954, he has served in Chicago, Houston, and Kansas City prior to his new assignment.

♦

R. G. RICHARDS has been appointed to a newly established position of director of development of Diamond Alakli Co.

Mr. Richards holds a BS degree in chemistry from the University of Massachusetts. He joined Diamond in 1952 as a technical service representative and later in a special staff position in research and development. Subsequently, he was transferred to the Plastics Division serving in the capacities of a project leader, manager of research and development, sales manager, and manager of planning and development.

He is a member of the Chemists' Club of New York, The American Chemical Society, the Society of Plastics Engineers, and the Cleveland Athletic Club.

♦

JOHN J. PAREDES has been advanced to the position of Midwest regional salesmanager of Geigy Industrial Chemicals with headquarters in Chicago. He joined Geigy in January 1959 and until recently has been field sales representative operating out of St. Louis.

Mr. Paredes is a graduate of Boston College where he received his AB degree in chemistry in 1950.

Prior to joining Geigy, Mr. Paredes was associated with the Monsanto Chemical Co. where he was sales supervisor for the Organic Chemical Division's special chemicals department and a member of the advertising and sales promotion staff.

E. L. Malone

R. A. Nyquist

EDMOND L. MALONE has been appointed technical service representative in New Jersey's Union and Middlesex Counties by Oakite Products, Inc.

Mr. Malone joined Oakite in 1955 as a member of the technical service laboratory staff, and has served since 1957 as field service representative in New York City. In his new territory, he joins Everett Ward and W. H. Halsted on the company's staff.

ROBERT A. NYQUIST has been appointed as a Metal Finishing Division sales engineer of Frederic B. Stevens, Inc.

Mr. Nyquist will represent Stevens in the Western portion of Michigan. He was previously chief process engineer with the Bay City Division of Electric Auto-Lite Co.

He is a past president of the American Electroplaters' Society, Saginaw Valley Branch, and an alumnus of the University of Minneapolis.

Mr. Nyquist will reside in Grand Rapids.

♦

CHARLES "CHUCK" DAVOLI has been appointed technical director of the Hampden Chemical & Equipment Co. of Philadelphia, a subsidiary of Hampden Color and Chemical Co., Springfield, Mass. Mr. Davoli was formerly with The Reynolds Co. as the head of their plating service lab for the past five years. Prior

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to this, Mr. Davoli was employed with Promat Div., Poor and Co., as eastern technical service manager. He also worked as general foreman with a local plating and polishing job shop.

Mr. Davoli has attended Miami University of Ohio and Pennsylvania State University. He served in World War II and in Korea in the U. S. Navy and presently holds the rank of Lt. Commander and is active in the Naval Reserve of Philadelphia.

♦

THOMAS L. (TOMMY) GRIFFIN has been appointed regional engineer for the ESBEC Corp. in the Worcester, Massachutetts and Southern New Hampshire area.

For eleven years he was manufacturing engineer for the Brown and Sharpe Manufacturing Co. of Providence, and for two years was sales engineer for Providence Mill Supply Co., specializing in abrasive products for metal finishing.

RICHARD J. MICHELINI has joined Geigy Industrial Chemicals' sales force organization with headquarters in Chicago.

Mr. Michelini is a graduate of Colorado State University.

Mr. Michelini previously was associated with Armour Chemicals in applications research and as a member of the sales promotion staff, then with The Virginia Smelting Co. as a field representative for the Chicago area.

♦

RICHARD W. GRIFFITHS of Pacific Palisades, Calif., has been named as director, western marketing of Vitro Corporation of America.

Mr. Griffiths will also head Vitro's newly-established West Coast facility at 2301 Pontius Ave., Los Angeles, where he will maintain administrative offices. He is an electrical engineer with 20 years in electronics engineering and marketing.

JOHN C. FEDORUK has been named technical director of Allied Chemical's General Chemical Div. Mr. Fedoruk succeeds Dr. **HOWARD H. HURMENCE**, who was recently named assistant director of research and development for the corporation.

With the division 19 years, Mr. Fedoruk was assistant technical director for the past six. Earlier he served as manager of General Chemical's development laboratory at Baton Rouge, La., and as research chemist at its plant in North Claymont, Del.

Mr. Fedoruk is a graduate of Yale University where he received a BS degree in chemical engineering in 1939. He is headquartered at the General Chemical Research Laboratory in Morristown, N.J.

♦

ALFRED BOZZUFFI has joined Rapid Electric Co., Inc. as chief electrical engineer. Mr. Bozzuffi, previously with the Richardson-Allen Corp. as assistant chief design engineer is a graduate of Pratt Institute, Brooklyn, N. Y. Military Radio and Radar schooling at Ft. Monmouth, N. J. and Ft. Holabird, Md., placed him with Military Intelligence in the Pacific Area for four years during World War II.

He heads the electrical design section at Rapid Electric with more than 14 years of rectifier and saturable reactor design experience.

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J. MERLE HOSDOWICH

J. Merle Hosdowich, chromium plating pioneer, died at Tucson, Arizona on July 15. He retired last year after 35 years' service with Metal & Thermit Corporation. He was 65.

Mr. Hosdowich was graduated from Carnegie Institute of Technology with the degree of BS in mechanical engineering. He held a research fellowship at Mellon Institute in Pittsburgh.

In 1923, he joined Metal & Thermit to do research and development work on chromium plating. In the late 1920's he became chief chemist and laboratory manager of United Chromium Corporation, an M&T subsidiary. From 1940 on, he served in various technical and advisory capacities with Metal & Thermit in New York and in Rahway, N. J.

The author of numerous technical papers and articles on chromium plating, Mr. Hosdowich was also a frequent speaker before professional and technical societies.

After his retirement, Mr. Hosdowich moved to Tucson from Scotch Plains, N. J. He is survived by his wife and a daughter.

ASM CONGRESS AND SHOW EXPECTED TO DRAW RECORD ATTENDANCE

It is predicted that an estimated 25,000 visitors to the Philadelphia Metal Show, October 17–21, will experience the greatest concentration of technical exhibits on metals, materials and processes in the 42-year history of the ASM Metal Shows.

New and unique, the featured Steel Arena is conceived as a dramatic educational area in the exposition, containing 16 of the nation's major steel companies. Included in this specialized grouping will be modernistic displays featuring steel forms and parts for an almost endless number of applications for industry and the consumer.

In addition, three other halls in Philadelphia's Trade and Convention Center will contain more than 200 exhibits from ten other categories established by the American Society for Metals. Restricting the National Metal Show's exhibit groups to the engineering areas of the metal industry creates an exposition whose very atmosphere focuses attention on the technical aspects of metals and materials.

Tom C. Campbell, editor-in-chief of *The Iron Age*, will present the featured address at the annual dinner of the American Society for Metals, Thursday evening, October 20 in the Bellevue-Stratford Hotel, Philadelphia.

Major awards of the society will be presented at the dinner, including the newly-created William Hunt Eisenman Award for engineering achievement. This award is in the name of the founder-member and 40-year national secretary and chief of the Society.

A 33-year member of the ASM, John Burlin Johnson, will become the 14th Gold Medalist. The Gold Medal was established in 1943 to recognize outstanding metallurgical knowledge and great versatility in the application of science to the metal industry, as well as exceptional ability in the diagnosis and solution of diversified metallurgical problems.

J. B. Johnson, considered one of the nation's leading experts on light metals, is chief scientist of the Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio.

Bruce Chalmers, a Harvard University professor and native of England, has been chosen to receive the Albert Sauveur Achievement Award, in recognition of his pioneering metallurgical achievements which have effected a marked basic advance in metallurgical knowledge.

Industry, science, education and research are represented in nominees for 1960–1961 officers and trustees of the American Society for Metals.

Dr. William A. Pennington, currently serving as vice president of the ASM, is nominee for president. He is professor of metallurgy at the University of Maryland, College Park, Maryland.

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Zinc Cyanide
Acid Copper Sulphate
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BRANCH NEWS

Total AES Branches U. S., Canada, Australia, Sept. 1, 1960—59.

BUFFALO

Speakers Announced For Fall Meetings

The Buffalo Branch will hold its first meeting of the 1960–1961 season Friday, September 9, 1960, at the Niagara Manor, Buffalo, New York.

The technical session will feature a talk by **A. C. Benning,** of the Harshaw Chemical Company. Mr. Benning has chosen "Duplex Nickel" as his subject.

Plans for the new season and reports on the National Convention held in Los Angeles will be covered in the business session and will be of utmost importance to all Buffalo members.

The October meeting will be held in Jamestown, New York on October 7, and will feature **W. A. Helbig Sr.** of the Atlas Powder Company. Mr. Helbig will speak on "Purification of Plating Solutions." The time and place of this meeting will be announced later.

Robert C. Eich
Secretary

CINCINNATI

Platers Win Annual Picnic Ball Game

There seems to be some disagreement as to the reason for the outcome of the Annual Ball Game between the Cincinnati Platers and Suppliers. Some say that **Stew Chipman's** Peddlers just didn't have it this year. Others say that his boys were playing "customer ball," because when it was all over the "Black Magic Boys," captained by President **Earl Leonhardt,** were victorious 27–15. The game was part of the festivities at the Annual Picnic held on July 16, at Sharon Woods. Ninety-five members and guests took part in the all day affair. Stew Chipman and **Gil Dillon** won the horseshoe tournament, while **Elmer Rehme** and **Bill Klink** were skillful enough to win the egg tossing contest.

After a delicious steak dinner other gentlemen were fortunate enough to win some very handsome door prizes. On behalf of the Branch, I would like to thank **George Bennett, Mike Queenan, Charlie Dumont** and their helpers for a terrific picnic.

David L. Kaplan
Secretary

MISSISSIPPI VALLEY

Barrett Presents Paper On Phosphate Finishes

The Branch held its final meeting of the year at Pronger's Restaurant in Davenport, Iowa. New officers for the 1960–1961 year were seated:

President, **A. W. Dennhart;** vice president, **Wilbur McKay;** second vice president, **John F. Miller;** secretary-treasurer, **Clyde Shepherdson;** librarian, **Kermitt Wolff;** assistant librarian, **Lloyd Gilbert.**

George Parisho reported on the progress of the planning for the Midwest Regional Conference to be held at the University of Notre Dame on October 29, 1960.

The speaker, **L. D. Barrett** of the International Rustproof Corp., Cleveland, Ohio gave an illustrated lecture on phosphating, showing original finishes, improvements and today's modern phosphate finishes.

Clyde Shepherdson
Secretary

NEW HAVEN

New Haven Branch Fetes Gaffney

The New Haven Branch honored **Bernard J. Gaffney** with a surprise testimonial dinner on June 9, on the occasion of his relinquishing the office of

secretary-treasurer after 17 years of dedicated service. The affair was held at the Sleigh House in Hamden, Connecticut and was attended by a capacity crowd representing all the Branches of the New England Region.

Walter P. Lynch, who twice served as president of the New Haven Branch, acted as master of ceremonies and cited Bernie for his outstanding work in organizing the New Haven Branch and the New England Regional Meeting.

In accepting the purse presented to him, Bernie delighted the crowd with many humorous anecdotes of his 17 years in office. Besides his service as secretary-treasurer, Bernie is also a past-president of the Branch, and a past general chairman of the New England Regional Meeting. He is eastern representative for Siefen Compounds, Inc. of Detroit.

The gala affair closed with the installation of officers for the 1960–61 season by **Frank J. Tirendi,** president of the Waterbury Branch. Quite appropriately, B. J. Gaffney was installed as historian. Other officers installed were **Harry R. Taylor,** president; **Edward R. Jorczyk,** vice president; **Leo F. Roberti,** secretary-treasurer; **Vincent J. Capuano,** librarian; **Harry Petrucci,** assistant librarian; **John Bevacqua,** sergeant-at-arms; **George F. O'Connor Jr., William K. Murray** and **Charles A. Kuster,** board of managers. The testimonial dinner was co-chairmanned by outgoing President George F. O'Connor Jr. and Past President William K. Murray.

William K. Murray

SAN FRANCISCO

Smith Speaks on Steam Equipment

The July 14 meeting was called to order by President **Guy Condrott** and he introduced eleven guests.

Librarian **Dick Mitchem** introduced the guest speaker, **Bruce Smith,** Malsbary Manufacturing Company, who spoke on "Steam Equipment For The Electroplating Industry."

Librarian Dick Mitchem reported on the Branch speakers' list. August is set up for a plant visitation. **Ezra A. Blount,** editor of *Products Finishing,* is scheduled to speak at the September meeting.

C. E. Snelgrove
Secretary-Treasurer

AES REGIONAL GROUPS AND COUNCILS

FARWESTERN EDUCATIONAL COUNCIL FORMED

The 47th Annual American Electroplaters' Society, held in Los Angeles, July 24th to the 28th, saw a gathering at 9:00 a.m. on Thursday, July 28th, of the officers of AES's five Far Western Branches. The proposed San

BRANCH SECRETARIES

Branch News is required of all Secretaries monthly by AES Bylaws. First of the month is Branch News deadline for next PLATING issue. Any items on hand on that date will be carried in that edition. Later arrivals will appear in the issue immediately following. In reporting talks given by speakers before the Branch, please give titles of the talks, the speakers' full identification and any other pertinent information of interest to other Branches and PLATING's broad readership.

Diego Branch, now organizing for admittance into the Society, was also represented.

This assembly was brought together to explore the possibility of establishing a Far West Regional Group. It was decided, however, that traveling distances made a Regional Group momentarily unfeasable.

The above discussion nevertheless led to the establishment of a Far Western Educational Council. It was proposed that all six Far Western Branches namely: British Columbia, Los Angeles, San Francisco, Portland, Seattle, and San Diego (if and when chartered) would work together to bring more and better speakers to the West Coast.

It was resolved that all Branch Meetings follow one another, so as to allow a speaker to be present at all six Branches within a two week period. San Diego will hold its meeting on the second Tuesday of every month; Los Angeles the second Wednesday; and San Francisco the second Thursday. Portland will meet on the third Tuesday, Seattle the third Wednesday, and Vancouver the third Thursday.

The Librarians of each Branch will exchange speaker lists so as to schedule speakers in the order above.

G. M. GUY CONDROTT
Acting Secretary
Far Western Educational Council

AES MEMBERSHIP REPORT

ELECTIONS

Allentown-Reading: K. C. Harms, I. Hauseman, M. W. Hoffman, R. J. Lee, R. R. Sharetts, H. W. Strause
Boston: P. J. Hunter, J. Gottlieb, K. Ogasapian, R. Fluke, R. O. Grunditz, L. A. Landers, H. A. Matheson, J. E. McGowan, S. L. Parker, H. W. Symonds, L. A. Tosi Jr., D. L. White, J. P. Willan
Miami: L. A. Manus, L. F. Marinello, J. H. Craig, H. H. Oakley, R. E. Neeld
Milwaukee: A. P. Lehmann, W. Timple, C. R. Toney, J. Vogel
Newark: R. Andrews
New Haven: M. W. Macek
Rochester: A. W. House
Rockford: C. Jensen, R. Leonardson, J. O'Neil
Saginaw Valley: G. N. Novak
St. Joseph Valley: J. H. Bickart, C. Bock, J. Curtis, L. J. Daufenbach, J. C. Emerick, F. Hart, R. Hartman, C. Jodon, P. Moore, R. L. Nagy, K. Sulkey, M. VanDierendonck
San Francisco: E. C. Call, T. Daly, E. Duffeck Jr., L. C. Humphrey, W. A. McNeely, I. K. Wright, J. D. Zachiegner
Seattle-Puget: J. K. Werner
Southeastern: D. O. Mundale
Toledo: W. H. Barney
Toronto: W. W. Thaker

REINSTATEMENTS

Mississippi Valley: J. Knanishu
San Francisco: J. Hito

TRANSFERS

Blue Ridge: W. H. Head Jr. from Southeastern
Cleveland: D. H. Snelgrove from Detroit, G. DeCario to Pittsburgh
Dayton: G. R. Lyons to Newark
Milwaukee: A. S. Brumm to Member-at-Large
Saginaw Valley: C. C. Stratman from Detroit, E. Kotches from Detroit, P. H. Norton from Grand Rapids
Member-at-Large: A. S. Brumm from Milwaukee

RESIGNATIONS

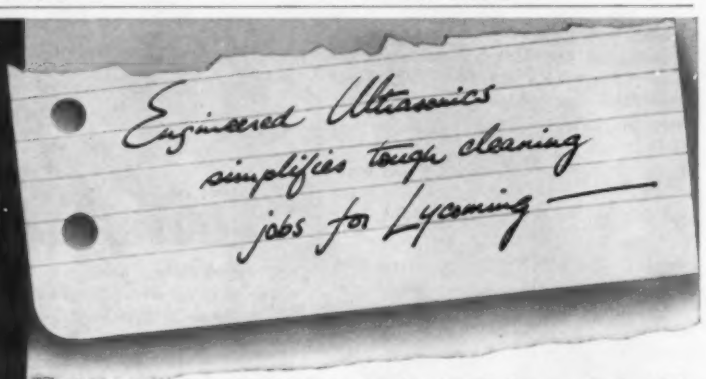
Blue Ridge: E. E. Martin, D. Fineberg
Buffalo: R. Pyles
Cincinnati: C. Garrett
Detroit: L. M. Radke, R. J. Crane, G. M. Brodie, G. DeMirgian, W. A. Wisckol
Hartford: J. S. Dixon, R. Mullaney, J. R. Sibley
Mississippi Valley: R. D. Ebersole
Newark: W. Strobach
Southeastern: T. F. Reilly
Member-at-Large: W. J. Netwon

SUSPENSIONS

Allentown-Reading: P. J. DeFrank, L. G. Hassel, A. L. Kaiser, G. L. McMichael, M. J. Reider, J. F. Riegel, C. Schaad, H. E. Schearer
Baltimore-Washington: M. M. Haddad, H. C. Barnes Jr., M. Bloom, R. L. Brenneman, L. M. Darrow, S. P. Grant, H. D. Jones, L. C. Kingsbury, L. N. Markwood, S. S. McNeill, C. W. Seiler, M. E. Shaff, O. W. Tomlinson
Blue Ridge: P. J. Lestician
Boston: R. Dion
Bridgeport: M. J. Brassard
British Columbia: G. A. Amos
Central Michigan: C. L. Tyler, W. L. Boyes
Dayton: W. L. Armstrong, T. E. Vogt
Milwaukee: K. Varndell, G. P. Beardsley
New Haven: H. C. Wood, J. P. King, G. W. Hottel, W. Drescher, J. G. Cerino, L. A. Carloni
Providence-Attleboro: A. F. Killian
Rockford: E. R. Wright, L. Ray, R. E. Bohnsack
Saginaw Valley: H. Welch, A. A. Somers, J. L. Shook, H. R. Shimel, J. E. Rosewarne, J. S. Putman, J. A. Neymeier, R. D. McAleer, J. Gold, J. DeWyse, H. E. Curtis, C. Auger
St. Joseph Valley: D. C. Adams, E. Adams, S. H. Arnolt, H. A. Davis, C. W. Farrell, C. E. Hill, A. Jurgensen, R. J. Kaehr, G. Keeley, R. Koski, J. N. Lientz, D. C. Mayer, J. P. McGee, L. Murray, R. E. Parkinson, D. V. Springer
San Francisco: A. B. Klein
Southeastern: G. H. Wilkinson, R. C. Steffey, C. F. Smith, H. Simms, R. E. Norman, J. N. Hutchins, R. L. Griffin Jr., R. B. Goodson Sr., C. Fox, C. A. Collings

DEATHS

British Columbia: T. Wallington
Newark: A. P. Munning



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September 16, 1960—**Second Metropolitan Regional Technical Session,** Newark Host Branch, Robert Treat Hotel, Newark, N. J.

September 16, 1960—**Editorial Board,** Hotel Statler, Boston, Mass.

September 17, 1960—**Boston Branch 24th Annual Educational Meeting and Banquet,** Hotel Statler, Boston, Mass.

September 21, 1960—**Dallas-Ft. Worth Branch, Annual Meeting,** Howard Johnson Turnpike Inn, Dallas, Texas.

September 23, 1960—**Research Committee Meeting,** National Headquarters, Newark, N. J.

September 24, 1960—**Montreal Branch Annual Banquet,** Queen's Hotel, Montreal, P. Q., Canada.

October 29, 1960—**Second Annual Midwest Regional Conference,** University of Notre Dame, South Bend, Indiana. St. Joseph Valley Host Branch.

December 2-3, 1960—**Detroit Branch Annual Educational Meeting and Banquet,** Statler-Hilton Hotel, Detroit, Mich.

December 3, 1960—**Executive Board,** Hotel Statler, Detroit, Mich.

December 16-17, 1960—**Newark Branch Annual Educational Session and Christmas Banquet,** Robert Treat Hotel, Newark, N. J.

January 28, 1961—**Chicago Branch Annual Meeting and Banquet,** Conrad Hilton Hotel, Chicago, Ill.

February 3-4, 1961—**Third Annual Dixie Regional Technical Session,** Hotel Roanoke, Roanoke, Virginia. Blue Ridge Host Branch.

February 4, 1961—**New York Branch Annual Educational Session and Banquet,** Hotel Statler-Hilton, New York, N. Y.

February 4, 1961—**Saginaw Valley Branch Annual Educational Session and Banquet,** Frankenmuth, Michigan.

February 4, 1961—**Seventh Annual Tri-State Regional Meeting,** Deshler-Hilton Hotel, Columbus, Ohio.

February 11, 1961—**Eighth Interim Meeting,** Supreme Society, Statler Hotel, Hartford, Connecticut. New England Regional Council, Host.

February 18, 1961—**San Francisco Educational Sessions and Dinner-Dance,** San Francisco, Calif.

March 4, 1961 (Tentative Date)—**Philadelphia Branch Annual Technical Session and Banquet,** Benjamin Franklin Hotel, Philadelphia, Pa.

FUTURE MEETINGS

March 4, 1961—Dayton Branch 15th Annual Educational Session and Dinner Dance, Biltmore Hotel, Dayton, Ohio.

March 11, 1961—Rockford Branch, Annual Meeting, Rockford, Ill.

April 29, 1961—Milwaukee Branch Annual Educational Session and Banquet, Schroeder Hotel, Milwaukee, Wis.

May 2, 1961—Central Michigan Branch Annual Educational Session and Banquet, Hotel Hayes, Jackson, Michigan.

May 4, 1961—Empire State Regional Meeting, Hotel Manger, Rochester, N. Y.

June 18-23, 1961—48th AES Annual Convention, Hotel Statler, Boston, Mass.

January 19, 1962—Ninth Interim Meeting, Supreme Society, Hotel Marott, Indianapolis, Ind.

June 25-28, 1962—49th AES Annual Convention, Schroeder Hotel, Milwaukee, Wis. Sponsorship Midwest Regional Council.

June 24-27, 1963—50th AES Annual Convention, Ambassador Hotel, Atlantic City. N. J. Sponsorship Newark Branch.

June 15-18, 1964—51st AES Annual Convention, St. Louis, Missouri.

June 16-18, 1964—6th Industrial Finishing Exposition, St. Louis, Missouri.

June 28-July 1, 1965—52nd AES Annual Convention, Statler Hotel, New York, N. Y.

June 1966—53rd AES Annual Convention, Hotel Fontainebleau, Miami, Florida. Dixie Regional Council, Sponsor. Southeastern Branch, Host.

INTERSOCIETY

September 26-30, 1960—Instrument Society of America, 15th Annual Meeting; Instrument-Automation Conference and Exhibit, Coliseum, New York, N. Y.

October 9-13, 1960—The Electrochemical Society, Fall Meeting, Shamrock Hotel, Houston, Texas.

October 12-14, 1960—American Vacuum Society, 7th National Symposium, Cleveland-Sheraton Hotel, Cleveland, Ohio.

October 17-21, 1960—American Society for Metals, 42nd National Metal Exposition and Congress, Trade and Convention Center, Philadelphia, Pa.

October 25-27, 1960—National Association of Corrosion Engineers, South Central Region Conference, Mayo Hotel, Tulsa, Okla.

November 8-11, 1960—Society of Die Casting Engineers, First National Die Casting Exposition and Congress, Detroit Artillery Armory, Detroit, Mich.

Nov. 27-Dec. 2, 1960—American Society of Mechanical Engineers, Winter Annual Meeting, Statler-Hilton Hotel, New York City.

January 24-27, 1961—Society of Plastics Engineers, 17th Annual Technical Conference, Shoreham Hotel, Washington, D. C.

Jan. 30-Feb. 3, 1961—American Society for Testing Materials, Committee Week, Netherland-Hilton Hotel, Cincinnati, Ohio.

Apr. 30-May 4, 1961—The Electrochemical Society, Spring Meeting, Claypool Hotel, Indianapolis, Ind.

June 25-30, 1961—American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

October 1-5, 1961—The Electrochemical Society, Fall Meeting, Hotel Statler, Detroit, Mich.

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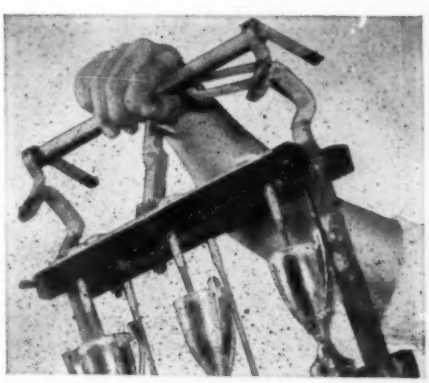

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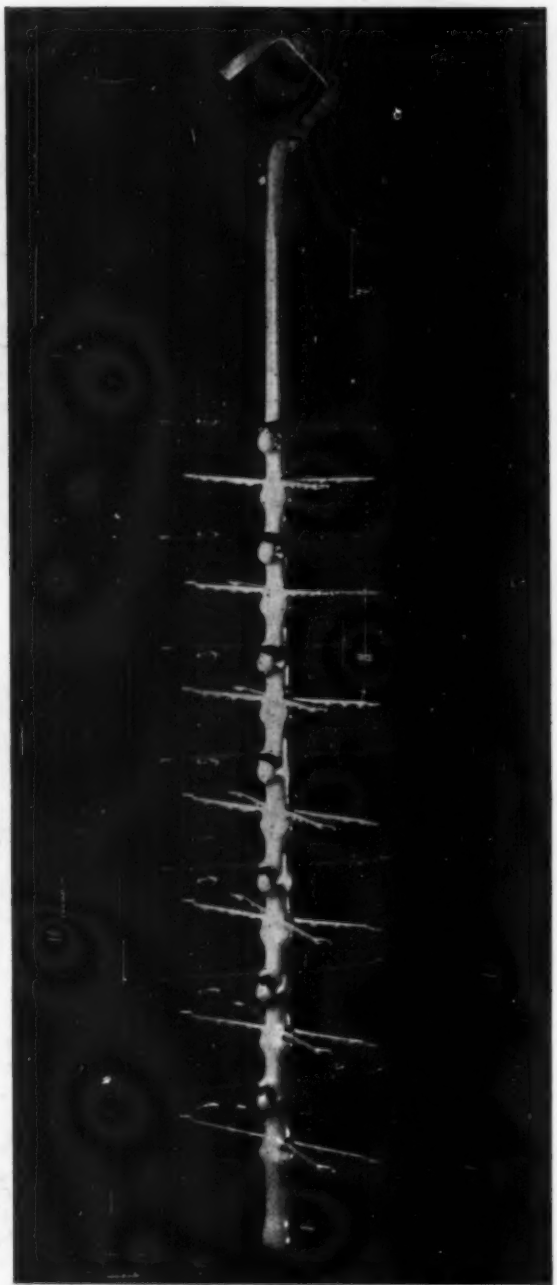

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